

# Blueprints for Private Investment in Ecosystem Restoration

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**Lessons from Case Studies**



WORLD BANK GROUP

PROBLUE



UNITED NATIONS DECADE ON  
ECOSYSTEM  
RESTORATION  
2021-2030

PROGREEN

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# About this report

**Ecosystem restoration is critical to the global ambition of halting and reversing nature loss.** Tremendous efforts have been deployed globally to conserve the remaining rainforests, grasslands, rivers and lakes, reefs and mangroves, and other ecosystems that are critical for safeguarding biodiversity and the ecosystem services that humanity depends on. However, the extent of environmental degradation is such that recovering the productivity of ecosystems where it has been lost is equally important – for nature, communities, and economic sectors.

**While restoration is often viewed as the purview of the public sector, this report demonstrates opportunities for private sector investment.** It aims to shift the perception that restoration finance is limited to grant funding from domestic and international public sources only. Drawing on case studies, it highlights the investment drivers and entry points for private finance in restoration projects. The financing models presented also point to opportunities for replication and scaling.

**The primary audience of this report is private investors**—project developers, corporates, financial institutions—that are considering investing in restoration. Development partners and philanthropic foundations are also important audiences, given their critical role in providing catalytic financing that can unlock private finance. This report also highlights action areas for policymakers, who have a role to play in creating a conducive policy environment for such ecosystem restoration investments.

**This report is a product of the Finance Task Force of the United Nations Decade on Ecosystem Restoration, an initiative led by the United Nations Environment Programme and the Food and Agriculture Organization of the United Nations.**

The United Nations Decade aims to drive the restoration of one billion hectares of degraded land between now and 2030. The role of the Finance Task Force, chaired by The World Bank, is to catalyze action that can contribute to unlocking the capital needed to meet the United Nations Decade's goals.



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# Executive Summary

## **The degradation of nature threatens human well-being and economic prosperity.**

In this report, nature refers to biodiversity, natural ecosystems, and the services they provide, such as clean air, abundant and clean water, fertile soils, productive fisheries. The widespread degradation of nature is driven by humanity's growing demands and pressures that exceed nature's ability to replenish, regenerate, and maintain balance. Globally, between 20 and 40 percent of the total land area is degraded (FAO 2021, UNCCD 2022). Marine and freshwater ecosystem degradation is also extensive. The combined effects of nature loss and climate change threaten to push the planet towards dangerous tipping points.

## **Restoration of nature is critical to the global goal of halting and reversing nature loss.**

Globally, tremendous efforts have been deployed to conserve the remaining natural ecosystems that are critical for safeguarding biodiversity. However, the extent of the damage to ecosystems is such that recovering productivity where it has been lost is equally important—for the good of nature, communities, and economic sectors. Restoration of nature, also referred to as “ecological restoration” or “ecosystem restoration”, is the process of helping degraded or destroyed ecosystems to recover (UNEP 2021a).

## **Restoration is principally funded by governments, international donors, and non-profit organizations. However, there are opportunities to increase private investment.**

The [Kunming-Montreal Global Biodiversity Framework](#), adopted by nearly 200 countries, sets a global target to place 30 percent of areas of degraded ecosystems under effective restoration by 2030. Achieving this target and other global and regional restoration pledges requires a substantial increase in financing from all sources, including private.

**For the private sector—whether corporates or investors—restoration can be a means to achieve net-zero targets, manage nature-related risks, achieve operational improvements, and take advantage of new business opportunities.**

This is driven by improved understanding of nature-related risks as well as opportunities in value chains and investment portfolios.

**Commercial restoration models are emerging—for example around sustainable agriculture and forestry, voluntary carbon markets, and mitigation banking—but the bankable pipeline is limited which limits the participation of institutional investors.**

Still, a wide spectrum of instruments ranging from private equity and debt to green bonds, carbon and biodiversity credits, and insurance is being used to channel private finance into ecosystem restoration projects.

**Investing in nature restoration presents a unique set of challenges.**

Investing in restoration is more complex, costly, and risky than investing in conservation. For example, the benefits of restoration accrue over time as the ecosystem recovers and may not be on a time scale compatible with private investors' expectations. Any successful restoration—whether of reefs, mangroves, forests, or soil on a farm—is often technically complex, which translates into higher implementation risks and a greater need for technical assistance as well as research and development. Moreover, most restoration projects are small and location-specific, and therefore need to be aggregated in investment vehicles to appeal to investors.

**This report presents six case studies of private investments in restoration that demonstrate how common financing barriers to restoration projects can be overcome.**

They demonstrate a range of investment drivers and entry points for private finance across different sectors, ecosystems, and regions. In focusing primarily on emerging market and developing economies the case studies highlight the relevance of restoration in—and financing approaches adapted for—the development context (Figure 1).

**Figure 1.** Summary of case studies

## TerraFund for AFR100



**Geography:** Africa (multiple)  
**Theme:** Forest landscape restoration  
**Investment drivers:** Corporate social responsibility (investors)  
**Instruments:** Grants; low-interest loans; equity investments  
**Investment size:** \$33 million deployed  
**Relevance:** Fund connects philanthropic and impact investors with community- and SME-led restoration projects

[Go to Case Study](#)

## Colombia Sustainable Cattle Ranching Project



**Geography:** South America (Colombia)  
**Theme:** Farmland; silvopasture  
**Investment drivers:** Insetting; productivity gains (small-scale cattle ranchers)  
**Instruments:** Payments for ecosystem services; grants  
**Investment size:** \$49 million  
**Relevance:** Incentives and financing scheme for cattle ranchers to restore pasture

[Go to Case Study](#)

## AGRI3 Fund

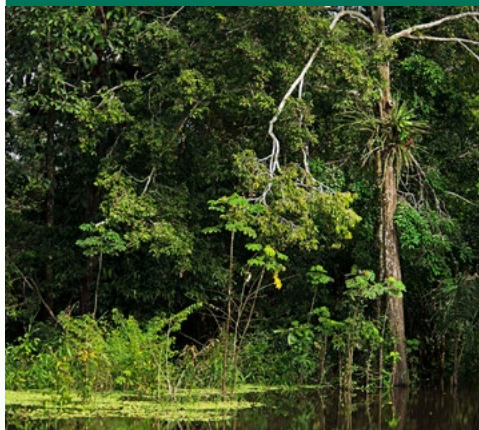


**Geography:** South America (Brazil) and South Asia (India)  
**Theme:** Farmland; sustainable agriculture (large commodity producers)  
**Investment drivers:** Insetting; market access (producers); returns (investors)  
**Instruments:** Blended finance fund providing partial risk guarantees  
**Investment size:** \$100 million capital base  
**Relevance:** Guarantees unlocking domestic loans for sustainable agriculture

[Go to Case Study](#)



## Bosques Amazónicos



**Geography:** South America (Peru)

**Theme:** Forest restoration; conservation

**Investment drivers:** Business opportunity (developer); offsets (carbon credits buyers); returns (investors)

**Instruments:** Voluntary carbon credits; corporate green bonds

**Investment size:** \$50 million in equity

**Relevance:** Capital markets financing upfront costs of forest restoration

[Go to Case Study](#)

## Resource Environmental Solutions



**Geography:** North America (USA)

**Theme:** Wetlands, streams, protected species habitat

**Investment drivers:** Regulation (buyers of offsets); business opportunity (developer); returns (investors)

**Instruments:** Offsets; private equity and debt

**Investment size:** Varies

**Relevance:** Regulation-driven model attracting large private equity investors

[Go to Case Study](#)

## Coastal restoration program at Iberostar



**Geography:** Caribbean and Central America (Dominican Republic, Jamaica, Mexico)

**Theme:** Coastal ecosystem restoration

**Investment drivers:** Insetting for risk reduction; operational improvements; business opportunity

**Instruments:** Company balance sheet

**Investment size:** Funded at the corporate level

**Relevance:** Embedding restoration in hospitality business

[Go to Case Study](#)

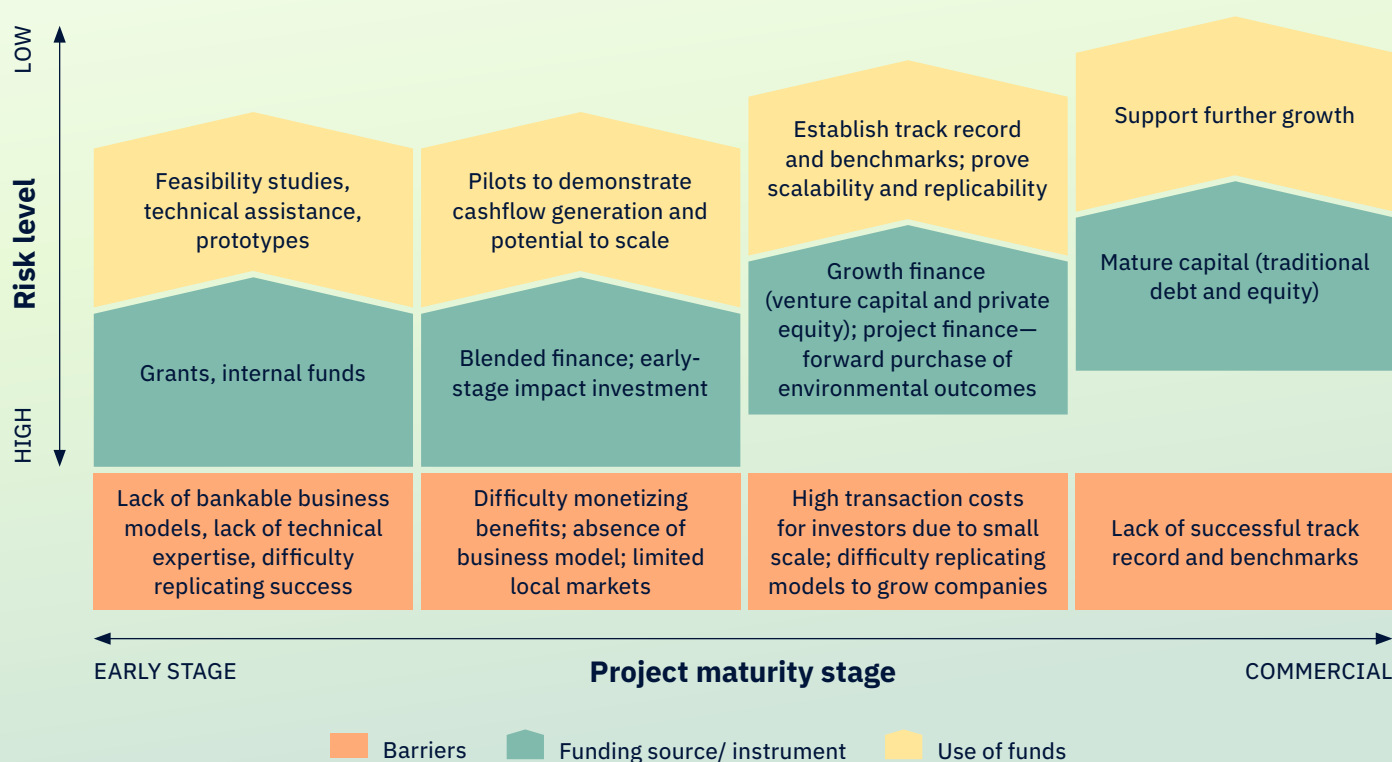
**There is investor interest—and potential capital available for—restoration. However, much of this is mature-stage capital and commercial debt, while most restoration projects need early-stage risk capital to cover the upfront costs of the design, piloting, and scaling of the business model.**

This capital can take the form of grants or early-stage impact investment. The absence of early-stage funding can be a significant barrier for smallholder farmers, small and medium-sized enterprises, and community-led restoration initiatives. Even for established businesses within value chains, such as agricultural commodity producers, lack of access to competitive financing can raise opportunity costs, preventing restoration or a shift to more sustainable practices from taking place at the scale and speed needed.

**Over time, restoration requires a continuum of capital providers—from venture philanthropy and impact investors to private equity and debt providers—to match evolving financing needs (Figure 2).**

Blended finance solutions have an important role to play in crowding in commercial capital and helping to pilot innovative and bespoke models and improve their risk-return profile. Aggregators and fund managers are also crucial for connecting small restoration projects with capital. Aggregators can create economies of scale by focusing on a specific geography and strategy, so reducing the transaction costs for investors. Regardless of the stage or financing source, the financial solution needs to remain adaptive.

**Figure 2.** Private finance mobilization at different stages of restoration project development



**Domestic banks are instrumental for financing sustainable value chains such as sustainable agriculture and forestry.**

In addition to implementing measures to de-risk investments, these banks could contribute to greater standardization of loan products, which would help reduce transaction costs and unlock more lending to companies that choose to adopt regenerative practices.

**Collaboration with local government and buy-in from local communities and producers**

are key for the success of restoration projects and for mitigating some of the business risks. Strong partnerships are critical for implementing restoration and sustaining restoration outcomes. Engaging local stakeholders—government, academia, producer associations, and local communities—is a prerequisite for many restoration projects, including those embedded in mixed-use landscapes or those that aim to incentivize change in the practices of economic sectors or communities. This may require a holistic perspective of the land or seascape to identify entry points through which different stakeholders can create value and sustainability.

**Achieving restoration at scale requires strong policy signals.**

Land-use decisions respond to a broad set of macroeconomic factors. Many of these factors lie outside of a restoration project's control, particularly for models that seek to incentivize a change in the behavior of local producers or communities. The case studies in this report highlight two targeted policies for scaling: incentives for value chains to incorporate restoration into their operations, and domestic regulation requiring environmental compensation.

**Ultimately, scaling up private finance in nature requires a broad transition of economic activity away from harmful practices that drive nature loss, and towards those aligned with the goals of the Kunming-Montreal Global Biodiversity Framework and its ambition to halt and reverse nature loss by 2030 with a view to full recovery by 2050.**

The case studies presented in this report point to several targeted actions that could be taken by governments, partners, investors, companies, and project developers to bring scale to restoration and better connect private finance with restoration projects (Box 1).

## BOX 1.

## Key action areas

The following actions would support the scaling of private finance for restoration.



## Governments and policymakers

- ✓ **Provide grant financing** for early-stage or proof-of-concept business models (see for example the [Conservation Innovation Grants program](#) administered by the United States Department of Agriculture).
- ✓ **Develop incentives** for value chains to incorporate restoration into their operations. Such incentives could include establishing environmental markets through payment for ecosystem services mechanisms.
- ✓ **Establish or strengthen the regulatory framework** by requiring companies to compensate for their negative impacts on nature by applying the mitigation hierarchy, that is, avoiding, minimizing, and mitigating adverse impacts on nature, or offsetting residual impacts (see for example IFC's Performance Standard 6). This would support the creation of a mandatory environmental offsets market.



## Companies and value chains

- ✓ **Assess the costs and benefits of restoration.** Benefits would include productivity gains and reduced risks.
- ✓ **Leverage the value chain in priority sectors** such as food and beverages, forestry, and textiles to create incentives for suppliers to integrate insetting-driven restoration projects in their operations. Large companies can explore opportunities to establish a credit facility for suppliers meeting environmental key performance indicators.
- ✓ **Test new approaches locally,** leveraging local networks and resources to mobilize local stakeholders.



## Financial sector

- ✓ **Approach investment in restoration as start-up investments** and less as real asset investments, given that few mature restoration-based business models exist and many still need to be discovered.
- ✓ **Focus on early-stage investment vehicles** that seek to back new business models or new technologies related to restoration. Collaborate with domestic and international philanthropic and public capital providers to create blended finance structures and lower the risk of investing in early-stage ventures.
- ✓ **Develop sector-appropriate standardized lending criteria and loan products** suitable for more established restoration-based models to streamline origination, given that domestic commercial banks are instrumental to financing sustainable value chains. Collaborate with financial industry associations such as the Network for Greening the Financial System to share best practices.



## Partners (including development partners and philanthropic investors)

- ✓ **Look beyond traditional grantmaking** and use capital to support research and development or technical assistance to help discover and test new business models. As an example, program-related and mission-related investments could allow foundations to provide risk capital to private enterprises that develop new business models but do not have access to traditional finance.
- ✓ **Establish funds that aggregate multiple restoration projects** along thematic or geographic themes to connect them to investors. Build in technical assistance, including for monitoring, reporting, and verification.
- ✓ **Establish—or provide concessional capital to—blended finance vehicles** to crowd in commercial capital and help pilot and scale innovative and bespoke business models.



# Introduction

**Humanity is embedded in nature:<sup>1</sup> our survival, well-being, and future economic prosperity depend on the presence of healthy, biodiverse ecosystems and the essential ecosystem services they provide.** Clean air, abundant and clean water, fertile soils, productive fisheries, and a stable climate are some of the services ecosystems provide, which are critical for healthy lives and healthy economies. One way to illustrate how nature contributes to economic activity is to look at sectors. More than half of the world's gross domestic product (GDP) is generated in sectors such as agriculture and construction, which are highly or moderately dependent on ecosystem services (WEF 2020, Evison et al. 2023).

**The extent and condition of natural ecosystems have decreased dramatically over the past five decades as humanity's demands and pressures on the biosphere have drastically increased (Dasgupta 2021).** This is happening at a scale and rate that exceeds nature's ability to replenish, regenerate, and maintain balance. An estimated 1.8 Earths is required to maintain the world's current living standards and economic systems (Global Footprint Network 2023). One million animal and plant species are now threatened with extinction (IPBES 2019). Globally, between 20 and 40 percent of the total land area is degraded, spanning croplands, drylands, wetlands, forests, and grasslands (FAO 2021, UNCCD 2022). A third of marine fish stocks is overfished, and 66 percent of marine ecosystems have been altered (IPBES 2019).

**This decline of natural capital and the ecosystem services it provides threatens communities, value chains, and entire economies** (Johnson et al. 2021). Since 1970, 14 of the 18 assessed categories of ecosystem services that underpin human well-being and economic prosperity have declined (IPBES 2019). The combined effects of nature loss and climate change threaten to push the planet toward dangerous tipping points. These trends have prompted governments to adopt global targets to halt and reverse nature loss. The [Kunming-Montreal Global Biodiversity Framework](#), adopted by about 200 countries, sets a global ambition to halt and reverse nature loss by 2030 with a view to full recovery by 2050.

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1 In this report, “nature” refers to biodiversity, ecosystems, and the services they provide.

## 1.1

## The rationale for restoration

**Putting economies on sustainable development pathways requires a focus on restoration, not just conservation.** Restoration of nature, also referred to as “ecological restoration” or “ecosystem restoration”, is the process of helping ecosystems that have been degraded or destroyed to recover (UNEP 2021a). It is not enough to merely conserve the natural capital that remains. To reverse the loss of nature, we also need to rebuild ecosystems that have lost functionality and integrity. For example, the growing risks of a “dieback”<sup>2</sup> of the Amazon rainforest due to continued deforestation and climate change have prompted calls for the creation of large-scale “arcs of restoration” in the region (Barlow et al. 2023), in addition to avoiding further forest loss. By buffering forest edges and increasing evapotranspiration, forest landscape restoration can help maintain primary forest ecosystems in the Amazon. Globally, countries have committed to placing 30 percent of areas of degraded ecosystems under effective restoration by 2030 (Convention on Biological Diversity 2022).

**Ecosystem restoration can take many forms and cater to different environmental and economic objectives (Box 2).** Restoration often entails a combination of activities intended to improve ecological or ecosystem health, or functioning to enhance ecosystem services (BenDor et al. 2015). Restoration can be driven by environmental objectives, such as recovering an ecosystem of high ecological value or mitigating climate change (restored landscapes generally sequester more greenhouse gases than degraded ones, and restoration can accelerate carbon sequestration). However, it can also be driven by economic goals such as reviving soil productivity on a farm, replenishing a declining fishery to safeguard coastal livelihoods and food security, reversing desertification in a drought-prone area that sustains livelihoods, or rebuilding a coral reef that supports tourism.

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2 The Amazon forest “dieback” hypothesis suggests that the region’s rainforest may be nearing an abrupt, basin-wide, climate-driven shift to a drought-prone vegetation with lower biomass, savannah, or even degraded vegetation (Lapola et al. 2018).

## BOX 2.

### The goals and outcomes of restoration

Ecosystem restoration encompasses a continuum of practices and goals (UNEP 2021a). Restorative practices can enhance ecological health actively, passively (by enabling natural regeneration), or through a combination of both. The “restorative continuum” (Gann et al. 2019) classifies restorative actions into the following groups:

- **Reducing impacts**, which involves transforming economies and production systems towards sustainable use.
- **Remediation**, which is done through bio-physical manipulation to reinstate basic ecological functions such as hydrology regimes.

- **Rehabilitation**, which involves progressively repairing and enhancing an ecosystem’s functioning and integrity to increase ecosystem service flows.
- **Ecological restoration**, which focuses on the full or substantial recovery of native biota and ecosystem functions, relative to a benchmark.

Restoration initiatives typically employ a range of restoration approaches, all of which can contribute to the recovery of native ecosystems and prevention of further degradation. Because restoration is fundamentally about the recovery of ecosystems, eliminating human sources of degradation is essential for enabling ecosystems to recover, regardless of subsequent interventions that may assist recovery (Chazdon et al. 2021).

Integrating both active and passive (or natural) approaches, and combining them, can make not only environmental, but also financial and economic sense (Figure 3). For example, the assisted natural regeneration of forest ecosystems—a blend of active planting and facilitating the natural recovery of native vegetation—is a cost-effective approach to restoring ecosystem services. According to some estimates, trees and forests can be restored using assisted natural regeneration at less than a third of the cost of tree planting (Chazdon 2022). However, assisted natural regeneration is not suited for every forest landscape. It works best in areas where the soils are not heavily degraded or compacted, and some forest remnants remain.

**Figure 3.** The environmental and financial benefits of restoration approaches

|                      | Type                                                         | Cost              | Biodiversity Benefits | Economic Potential |
|----------------------|--------------------------------------------------------------|-------------------|-----------------------|--------------------|
| Nature regeneration  | Natural forest regrowth                                      | \$ \$ \$ \$ \$ \$ | 🌿 🌿 🌿 🌿               | ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️  |
|                      | Assisted natural regeneration                                | \$ \$ \$ \$ \$ \$ | 🌿 🌿 🌿 🌿               | ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️  |
|                      | Ecological restoration                                       | \$ \$ \$ \$ \$ \$ | 🌿 🌿 🌿 🌿               | ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️  |
| Active reforestation | Small farmer reforestation e.g. agroforestry woodlots        | \$ \$ \$ \$ \$ \$ | 🌿 🌿 🌿 🌿               | ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️  |
|                      | Commercial large-scale reforestation                         | \$ \$ \$ \$ \$ \$ | 🌿 🌿 🌿 🌿               | ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️  |
|                      | Commercial reforestation with safeguards, e.g. certification | \$ \$ \$ \$ \$ \$ | 🌿 🌿 🌿 🌿               | ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️  |

Source: Adapted from WRI (2022) and Chazdon et al. (2021)

**Ecosystem restoration has economic value and can be a source of jobs and economic growth.** From the perspective of an investor—be it a public, private, or philanthropic investor—restoration can generate market benefits in the form of financial returns or savings, as well as social and environmental non-market benefits (Figure 4).<sup>3</sup> For every dollar spent on ecosystem restoration, the economy gains between \$7 and \$110 in the form of benefits from ecosystem services.<sup>4</sup> In the United States, for example, it is estimated that the domestic ecological restoration sector directly employs 126,000 workers and generates \$9.5 billion in economic outputs (sales) annually (BenDor et al. 2015). It also indirectly supports an additional 95,000 jobs and \$15 billion in economic output through business-to-business linkages and increased household spending.

**Figure 4.** The benefits of restoration by investor sector

| Benefits of restoration investment |                                                                  | Public | Private | Philanthropy |
|------------------------------------|------------------------------------------------------------------|--------|---------|--------------|
| Market                             | Increased food production yield                                  |        | ✓       |              |
|                                    | Increased ecotourism revenues for businesses                     |        | ✓       |              |
|                                    | Reduce cost for water regulation and purification                | ✓      | ✓       |              |
|                                    | Carbon market revenues                                           | ✓      | ✓       |              |
|                                    | Avoided damages and cost of natural disasters                    | ✓      | ✓       |              |
|                                    | Increased supply chain resilience                                |        | ✓       |              |
|                                    | Market opportunities (sustainable products, certifications)      |        | ✓       |              |
|                                    | Lower insurance premiums (parametric disaster risk)              | ✓      | ✓       |              |
|                                    | Increased concessional finance opportunities                     |        | ✓       |              |
|                                    | Quicker access to ESG finance                                    |        | ✓       |              |
| Non-Market                         | Increased food security                                          | ✓      |         | ✓            |
|                                    | Increased recreation services                                    | ✓      |         | ✓            |
|                                    | Increased human health                                           | ✓      |         | ✓            |
|                                    | Decreased disaster risk (regulation services)                    | ✓      | ✓       |              |
|                                    | Climate mitigation, adaptation and low carbon economy transition |        | ✓       |              |
|                                    | Biodiversity: Genetic resources                                  | ✓      | ✓       |              |
|                                    | Biodiversity: Intrinsic/cultural values                          | ✓      |         | ✓            |

Key: Higher risk adjusted returns on capital

Source: World Bank (2022).

3 “Market benefits” refer to those that typically generate financial returns or savings to investors, while “non-market benefits” are public in nature and do not usually generate cash flows.

4 Range based on a series of studies including FAO and UNEP 2021, Verdone and Seidl 2017, UNEP et al. 2018, Blignaut et al. 2014, Groot et al. 2013, and WRI 2017.



## 1.2

## The financing challenge

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**An estimated \$700 billion of public and private finance will be needed each year over the next decade to successfully implement the [Kunming-Montreal Global Biodiversity Framework](#) and reverse nature loss.** The framework aims to close the funding gap through a combination of phasing out of environmentally harmful subsidies (progressively reducing them by at least \$500 billion by 2030) and mobilizing at least \$200 billion per year from public and private sources. Currently, only between \$120 billion and \$140 billion is invested in biodiversity conservation each year (Deutz et al. 2020). Most of this is in the form of domestic public spending. Other analyses indicate that \$130 billion currently flows into nature-based solutions each year, of which 86 percent comes from public funds and 14 percent from private finance (UNEP 2021b).

**Despite the benefits, restoration of nature remains underfunded.** Even though the need for ecosystem restoration is vast, many restoration pledges such as the [Bonn Challenge](#) and the [United Nations Convention to Combat Desertification Land Degradation](#) remain underfunded. This can partly be attributed to restoration being seen as primarily an area for public intervention and investment, given the extensive positive externalities it generates for people's well-being.

## 1.3

## Purpose of this report

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**This report aims to shift the perception that restoration finance is limited to grant funding from domestic and international public sources, and thus strengthen the case for private investment.** It does so by highlighting the range of investment drivers and entry points for private finance in restoration and showcasing examples that have successfully overcome common barriers faced by restoration projects. Considering the scale of the global restoration pledges, it also aims to identify financing models with potential for scale and replication, including in emerging market and developing economies.

**The primary audience of this report are private investors in restoration**—project developers, corporates, financial institutions—that are considering investing in restoration. Development partners and philanthropic foundations are another key audience, given their critical role in providing catalytic financing that can unlock private finance. Policymakers, another key target audience, also play an important role in creating a conducive policy environment for such investments.

**The report is part of a series of analytical outputs of the Finance Task Force of the United Nations Decade (UN Decade) on Ecosystem Restoration.** The scale of the converging climate change, nature loss, and land degradation crises requires coordinated cross-sectoral action to develop systemic solutions to these complex and pressing challenges. This is precisely the type of collaboration the World Bank-chaired Finance Task Force of the UN Decade on Ecosystem Restoration aims to foster. The role of the Task Force is to catalyze action that can contribute to unlocking the capital needed to meet the UN Decade's goals.

**The six case studies presented highlight opportunities for unlocking private sector investment.** They demonstrate a range of investment drivers and entry points for private finance in restoration across different sectors, ecosystems, and regions. However, the solutions presented in this report are not exhaustive. The case studies also acknowledge the critical role local communities and other stakeholders—as well as an enabling policy environment and institution- and capacity-building—play in developing projects and securing long-lasting restoration impacts.

**The process of identifying case studies for this report revealed that the pool of publicized examples of bankable models under implementation is limited.**

The development of a restoration market would benefit from publicly accessible data and successful examples. The emerging pipeline of restoration initiatives—not yet under implementation and not covered in this report—would also merit future study and dissemination.

**The case studies presented in this report rely on publicly available information and insights shared in interviews.** Information may therefore be slightly dated. Nothing in this report constitutes investment or financial advice and the information provided is only intended to illustrate emerging financing models and solutions. Its purpose is to spark a conversation about the opportunities for private investment in restoration.

## 2

## Investment Drivers and Constraints

**Restoration finance is still dominated by public and donor funding, but a growing pool of new private actors is looking for opportunities to invest in restoration, either directly or indirectly.** Interest is fueled by a growing awareness of nature-related risks and opportunities. Degradation of nature and loss of the vital ecosystem services that underpin economic sectors translate into material risks for companies and their investors. In the real sectors (non-financial companies and their value chains), investment in restoration can be driven by a regulatory obligation to restore nature; a need to reduce material risks through voluntary offsetting and corporate social responsibility; a desire to make operational improvements; and the identification of new business opportunities. For the financial sector, the key drivers are environmental, social, and governance (ESG) disclosure and risk management; corporate social responsibility and marketing considerations; and financial returns. A range of instruments and approaches (including debt, equity, and balance sheet investments) can connect capital to restoration projects, but key barriers such as weak bankability need to be overcome.

## 2.1

### Drivers of private investment in ecosystem restoration

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#### Why nature is relevant to the real and financial sectors

**The private sector's understanding of nature-related risks is growing,** especially among companies whose value chains depend and have an impact on nature and among institutional investors (including asset managers, commercial banks, and insurance companies). More than half of the world's total GDP—equivalent to about \$58 trillion—is highly to moderately dependent on ecosystem services. For sectors such as agriculture, textiles, construction, and tourism, the risks that stem from

the degradation of ecosystems and the services they provide are material (Box 3). More than half the market value of listed companies on 19 major stock exchanges is exposed to such risks (Evison et al. 2023).

### BOX 3.

#### Types and materiality of nature-related risks

Information is considered “material”—or relevant—if it could influence the decisions made by an investor or stakeholders of a reporting company. Nature-related risks are assessed from a two-dimensional perspective of “double materiality”,<sup>5</sup> which encompasses dependencies of a company or sector on nature, as well as risks that stem from a company or sector’s negative impacts on nature. Assessing double materiality requires consideration of financial materiality (matters that influence the company or sector’s value) as well as impact materiality (matters that affect the economy, environment, or people) (GRI 2023).

Nature-related risks can, in turn, be categorized as:

- **Physical risks**, which stem from the degradation of nature and related loss of biodiversity and ecosystem services. Such losses cause acute or chronic impacts on the financial bottom lines of businesses in sectors such as agriculture, beverages, textiles, construction, and hospitality through changes in the quality and quantity of key inputs, supply-chain disruptions, or damage to assets. The financial sector is indirectly exposed to physical risks when it finances companies that are exposed to such risks.

- **Transition risks**, which stem from potential disruptions and shocks resulting from the anticipated transition to a nature-positive economy. These can include changes in regulations or incentives, a shift in consumer preferences, and growing public pressure to consider environmental impacts of economic activity (Power et al. 2022).

Both physical and transition risks can include litigation risks arising from liability claims, policy and regulatory changes, and misconduct. Crucially in the context of nature loss, local impacts and dependencies can have systemic implications due to spill-over and feedback effects between the real and financial sectors (NGFS 2023).

5 Double materiality has two dimensions, namely impact materiality and financial materiality (European Commission 2023, TNFD 2023).

**This growing awareness of nature-related risks, combined with the adoption of a new set of global targets for nature, has generated political momentum and engaged financial and corporate leaders.**

The Kunming-Montreal Global Biodiversity Framework underscores the private sector’s critical role: Target 14 calls for alignment of financial flows with the goals and targets of the framework, while Target 15 calls for large and transnational companies and financial institutions to assess and disclose their risks, dependencies, and impacts on biodiversity. Private sector engagement and voluntary action have grown tremendously in recent years. For example, the [Finance for Biodiversity Pledge](#), signed by 153 financial institutions representing over €21 trillion in assets, commits signatories to assessing their impacts on nature, setting targets, and reporting on nature risks on a voluntary basis.



The [Taskforce on Nature-related Financial Disclosures](#)—which is led by 40 corporations, service providers, and financial institutions representing over \$20 trillion in assets under management—recently launched recommendations for nature-related risk management and disclosures for companies and the financial sector (TNFD 2023).

**Awareness about nature-related investment opportunities, including those linked to restoration, is also growing.** More than \$35.3 trillion of assets under management worldwide are said to be monitored through a sustainability lens, which considers ESG factors alongside conventional financial analysis—an increase of 55 percent since 2016 (GSIA 2020). Sustainable investing—while a broadly defined and interpreted concept at present—is also on the rise and reflects the world’s major financial markets’ interest in such opportunities. However, nature finance—which includes investments in conservation, restoration, and sustainable use of nature—remains a niche segment of the sustainable finance market. Indeed, the 2023 Global Impact Investor Survey found that investments in “conservation and forestry” represented less than 4 percent of the investment portfolio of the respondents (GIIN 2023). Likewise, only 16 percent of the green and sustainability-linked bonds issued globally in 2023 feature natural ecosystems in their use of proceeds (Sustainable Fitch 2023).

## Investment drivers for the real sectors

**Businesses and value chains in sectors such as agriculture, textiles, construction, and hospitality can proactively shift to more sustainable practices that incorporate ecosystem restoration,** to reduce the risks of disruption to their raw material supply lines and to maintain market opportunities, should consumer demand shift to more sustainable products. Some companies are already doing so in response to environmental regulations (or the threat of such regulations) that require them to offset greenhouse gas emissions or adverse impacts on nature. Voluntary “insetting”<sup>6</sup> is another key strategy for reducing the environmental footprint of operations along value chains.

**Corporate social responsibility-linked funding is another growing pool of private finance supporting restoration.** Both small and large corporations are embedding sustainability into their corporate strategies or seeking to address the systemic risks arising from nature degradation by making commitments to help halt and reverse nature loss. Some companies invest in restoration to achieve social or development outcomes, such as livelihood creation or poverty reduction, particularly in developing countries.

6 The [International Platform for Insetting](#) defines insetting as a way for companies to harmonize their operations with the ecosystems they depend upon and transition to a more sustainable business model. Insetting projects are interventions along a company’s value chain that are designed to reduce its environmental footprint: reduce greenhouse gas emissions reductions and carbon storage, and create positive impacts for communities, landscapes, and ecosystems.

**Restoration also presents opportunities for businesses to improve their value proposition** (for example, by opening access to markets for products with sustainability certification), or to become more cost-efficient, or tap into new revenue sources (for example, by selling carbon credits generated through restoration). Shifting regulations and incentives are also creating new business models and markets in technology and professional services. For further details see Figure 5.

**Figure 5.** Restoration investment drivers for the real sectors (companies and value chains)

|                    | <i>Investment driver</i>                                     | <i>Examples of investments</i>                                                                                                                                                                                                                                                    |
|--------------------|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Risk</b>        | <b>Regulatory obligation</b>                                 | <ul style="list-style-type: none"> <li>• Purchase of wetland credits to offset unavoidable ecological damage from infrastructure development</li> </ul>                                                                                                                           |
|                    | <b>Voluntary offsetting/insetting for risk reduction</b>     | <ul style="list-style-type: none"> <li>• Purchase of carbon offsets from a project restoring nature (for example, mangrove or forest restoration)</li> <li>• Producer shifts to restorative agriculture to reduce the runoff of chemical fertilizer into local streams</li> </ul> |
| <b>Opportunity</b> | <b>Corporate social responsibility/marketing</b>             | <ul style="list-style-type: none"> <li>• Company provides grants to an investment fund that focuses on restoration projects</li> </ul>                                                                                                                                            |
|                    | <b>Operational improvement/cost reduction</b>                | <ul style="list-style-type: none"> <li>• A hotel operator restores barrier reef to reduce the costs of maintaining its beach</li> <li>• A small agricultural producer restores soil to improve agricultural yields</li> </ul>                                                     |
|                    | <b>Financial returns/new revenue or business opportunity</b> | <ul style="list-style-type: none"> <li>• Establishing a sustainable timber and forest restoration project that offers market returns</li> <li>• Developing a habitat conservation bank on a stranded piece of property owned by a company</li> </ul>                              |

## Investment drivers for the financial sector

**Investors—whether driven by risks, opportunities, or both (Figure 6)—aim to capitalize on the real sectors’ interest in restoration.** Asset managers, private equity firms, investment and commercial banks, endowments, and insurers that support restoration typically seek to reduce their exposure to investments that are heavily degrading natural ecosystems by divesting from such assets or by diversifying their portfolio with sustainable (or ESG-aligned) investments by increasing the share of such investments. Some financial-sector pioneers are also looking at restoration as a potential business opportunity.

**Figure 6.** Restoration investment drivers for the financial sector

|                    | <i>Investment driver</i>                                         | <i>Examples of investments</i>                                                                                                                                                                                                                              |
|--------------------|------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Risk</b>        | <b>ESG disclosure/<br/>risk management</b>                       | <ul style="list-style-type: none"> <li>Asset manager divests from assets and companies that are driving degradation of nature</li> <li>Asset manager hedges or diversifies portfolio with green bonds or nature-related private equities</li> </ul>         |
|                    | <b>Corporate social<br/>responsibility/marketing</b>             | <ul style="list-style-type: none"> <li>Asset manager provides grants to an investment fund focusing on restoration projects</li> <li>Investment bank provides below-market-return capital to blended financial vehicles that support restoration</li> </ul> |
| <b>Opportunity</b> | <b>Financial returns/new revenue<br/>or business opportunity</b> | <ul style="list-style-type: none"> <li>Retail bank creates a new credit line for sustainable forestry or regenerative agriculture</li> <li>Equity investment in a restoration project developer</li> </ul>                                                  |

## 2.2

## Entry points for private investment in restoration

**Key entry points for private finance include acquiring the underlying asset; financing restoration activities or the entity implementing them; or purchasing the environmental outcomes generated by restoration activities.** Private investors—whether companies or institutional investors—can directly finance restoration projects or restoration-based businesses. Companies can also directly finance restoration activities through their operations or value chains (in the case of “insetting”), or by purchasing the environmental outcomes generated by restoration. Institutional investors tend to invest in funds that aggregate multiple restoration projects (Figure 7). A range of instruments and approaches (including debt, equity, and balance sheet investments) can be used to connect restoration initiatives with capital that seeks various rates of return (Box 4). These instruments and approaches include:



### Equity-based instruments

The development of the restoration economy is attracting private equity investors looking to capitalize on the growth of project developers. As an example, the [Mirova Natural Capital's Land Degradation Neutrality Fund](#) has purchased redeemable preference shares in Miro Forestry and Timber Products, which develops afforestation projects on degraded land in Ghana and Sierra Leone (Miro Forestry and Timber Productions 2022).



### Debt-based instruments

Investors can lend capital to project developers, companies, communities, or investment funds. An example is the [EcoEnterprises Fund](#), which provides creative debt solutions such as mezzanine financing and long-term debt to small businesses that support nature conservation and restoration (for example through regenerative agriculture) in South America. Loans suited for restoration activities are particularly important for shifting small and medium-sized agricultural producers and processors to more regenerative practices.



### Thematic bonds

"Green", "blue", and sustainability-linked bonds create opportunities to connect capital markets with project developers or companies implementing restoration. For example, [Blue Forest Conservation](#) developed a Forest Resilience Bond in partnership with the World Resources Institute to speed up forest treatments (such as prescribed fires and removing ground fuel) and reduce the risk of catastrophic wildfires. The bond has raised private capital from [Calvert Impact Capital](#) and CSAA Insurance Group to fund the upfront costs of forestland restoration in the North Yuba River watershed (Convergence 2020). The beneficiaries of reduced fire risk—which include the United States Department of Agriculture Forest Service, the State of California, and Yuba Water Agency—share the cost of reimbursing investors over time.



### Grants

Private and philanthropic investors may provide non-repayable grants. For example, [Commonland](#), a non-governmental organization (NGO) that is partially funded by grants from private donors such as Volkswagen and the IKEA Foundation (Commonland 2022), provides long-term (20 year) unrestricted grant funding for landscape restoration. In southeastern Spain, Commonland is using this model to help farmers in the [AlVelAl Association](#) transition to regenerative agriculture. Grants help lower investment risks and foster the involvement of private investors. Grants and other forms of concessional finance also serve as catalytic capital in pooled or blended financing vehicles, allowing commercial capital to come in as well.



### Corporate balance sheet investment

Some companies invest in ecosystem restoration within their value chain to improve their operations and reduce their environmental footprint via insetting. For example, Nespresso aims to source coffee from producers that meet the AAA Sustainable Quality Program standard that the [Rainforest Alliance](#) developed. With the help of a loan from International Finance Corporation, Nespresso financed a shift to agroforestry that involved planting native shade trees on the East African coffee plantations from which it sources coffee (IFC 2023). This investment provided training, delivered tree seedlings, and supported reforestation at the landscape level.



### Purchase of environmental outcomes

The purchase of environmental outcomes (which can take the form of carbon credits, biodiversity credits, or other instruments that capture improvements in ecosystem services due to restoration) is particularly relevant for companies seeking to offset their environmental footprint in line with a voluntary sustainability commitment or a regulatory obligation. For example, companies such as Danone and Hermès finance the community-led restoration of forests and mangroves and the expansion of agroforestry through the [Livelihoods Carbon Funds](#) and claim the carbon credits these projects generate to offset their carbon footprint on a voluntary basis. The mandatory markets are also creating opportunities for project developers such as [Terrasos](#), a Colombian company that is creating habitat mitigation banks for domestic companies that are required to offset their environmental impacts under the law. Terrasos is exploring opportunities to generate biodiversity certificates for the voluntary market as well.





### Purchase of the underlying asset

This refers to acquiring the land in need of restoration. In Scotland, for example, ultra-high-net-worth individuals and other private investors are showing an interest in purchasing and restoring degraded peatlands in response to the Scottish Government's commitment to restore 250,000 hectares of peatlands by 2030 and the adoption of the [Peatland Code](#), which creates a voluntary certification standard for United Kingdom-based peatland projects and so promotes voluntary carbon market development (Hurley et al. 2023).



### Investment is supporting technology

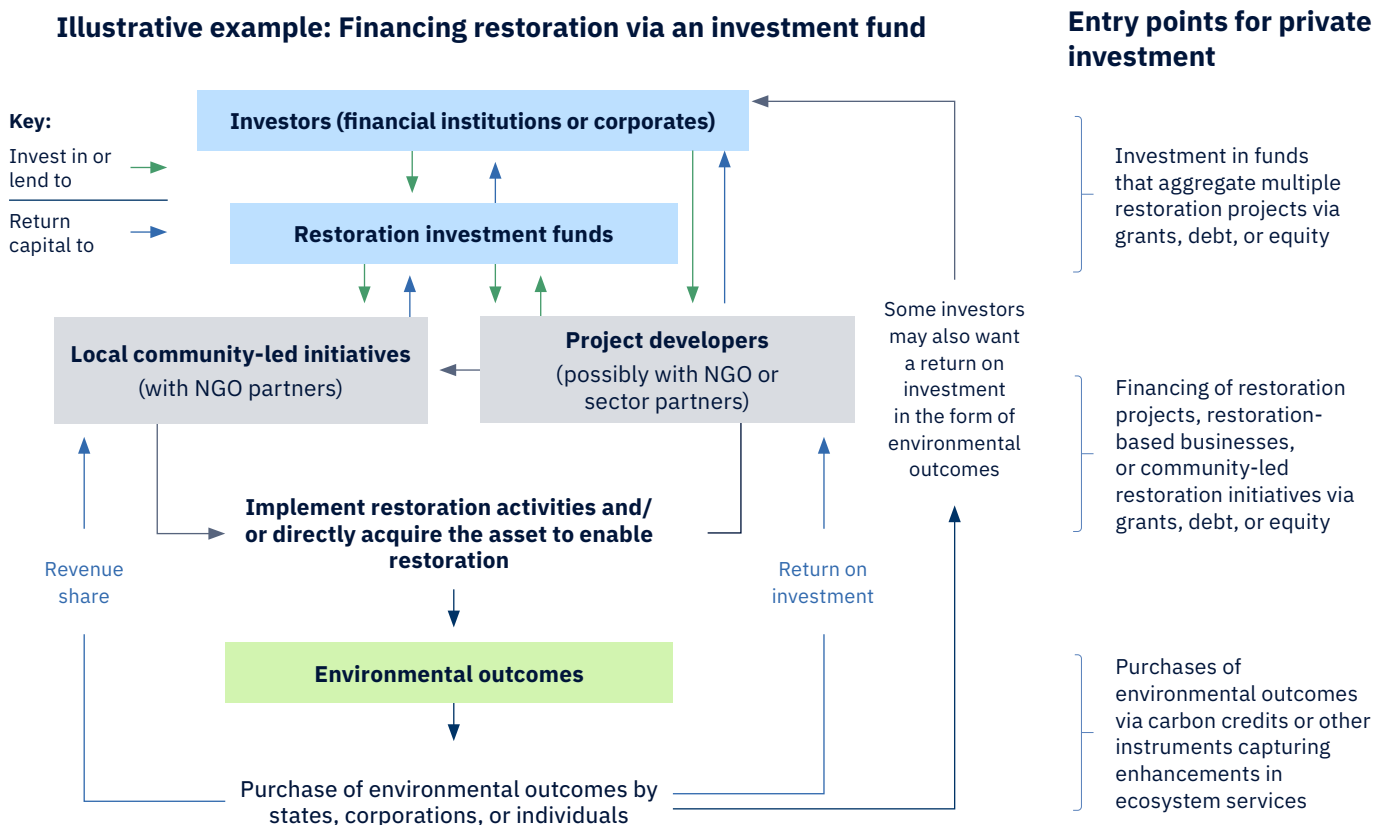
Investors can engage in early-stage businesses such as nurseries, engineering companies, and restoration contractors that are developing technologies to support nature conservation and restoration. Examples include [Dendra Systems](#), which offers a management platform for large-scale land-restoration projects that integrate artificial intelligence and use drones for direct aerial seeding efforts; [Gybe](#), which allows for the efficient monitoring of water-quality improvements generated by restoration projects; and [Coral Vita](#), a company specializing in setting up and operating coral nurseries and replanting coral reefs.



### Insurance for natural assets is an emerging opportunity

The instrument was initially developed for cash-flow-producing natural assets such as standing timber. More recently, policies have been developed to protect coral reefs in the Caribbean and Hawaii (GIZ 2023). In the case of a parametric insurance policy, funds are made available soon after a hurricane hits an area and the proceeds can be used to restore a degraded reef. Companies and donors can choose to participate in the policy premium payment either to protect their operations from disruption (for example, in the case of a recreational dive operator) or for philanthropic or corporate social responsibility reasons.

**Figure 7.** Key entry points for private finance (investment fund example)



**BOX 4.****What types of returns do investors expect?**

Returns on investment in restoration can be direct (through financial returns) or indirect (through operational improvement or increased brand value).

Direct returns can be further classified as market-rate returns or below-market-rate (concessionary) returns. Concessionary returns can be defined as a return expectation that is below what a professional investor would expect for the same level of risk. Because investment in nature is a new strategy, there are no established return and risk benchmarks. Instead, individual investors determine their

return expectations based on their investment motivations and on the role nature plays in their broader investment strategy. For example, some investors may regard nature investments as part of their real asset strategy and therefore relatively low risk,<sup>7</sup> while others may consider these investments as unproven and expect venture capital-type returns.

<sup>7</sup> For example, the New Mexico Educational Retirement Board explicitly includes an allocation of up to 30 percent to mitigation banking in its real asset investment strategy and targets gross-of-fee total returns of 10 percent (New Mexico Educational Retirement Board 2021).

**2.3****Barriers to private investment in restoration**

**While demand for restoration-related investment opportunities is growing, the uptake of restoration in value chains and the pipeline of “bankable” restoration projects attracting private investors remain limited.** The real and financial sectors face similar barriers to investment related to limited awareness of restoration-linked opportunities, lack of data and tools to assess them, as well as the perception of high risk and low returns.

**Real sectors (companies and value chains)**

**Monetizing the benefits of restoration is a key challenge that results in weak incentives and limited uptake of restoration in value chains.** Ecosystem services such as the provision of clean water and productive soil often have “public goods” characteristics. Because markets for environmental services such as water provision and carbon sequestration are fairly nascent, and their adoption is in the early stages at the global level, it can be difficult for investments in nature—including restoration—to generate monetizable cash flows (World Bank 2021b). Even where such projects do generate cash flows, financial returns tend to be below market return hurdles. Payment for ecosystem services (PES) mechanisms, carbon markets, and mitigation banking have emerged to address this challenge in certain jurisdictions, but they need to be scaled up substantially and offer adequate compensation to support the commercial viability of restoration projects.

**Lack of knowledge about bankable business models for restoration projects is another common obstacle.** Business models involving financial returns from nature restoration are relatively unproven. For example, the promise of regenerative agriculture has generated interest from corporates and investors, but it lacks a track record. Technical knowledge and data on the costs and benefits of restoration are also lacking. Figure 8 summarizes these and other barriers.

**Figure 8.** Common barriers to investment in restoration (corporates and value chains)

| Limited awareness of restoration as an investment opportunity                                                                                                                                                                                                                                        | Lack of tools/data                                                                                                                                                                       | High perceived risk                                                                                                                                                                                                                                                                                                                                                                        | Potentially low financial returns                                                                                                                                                                                                 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>Limited awareness of restoration opportunities and benefits</li> <li>Limited knowledge of bankable models</li> <li>Lack of staff with technical expertise or lack of available advisory</li> <li>Limited access to credit suitable for restoration</li> </ul> | <ul style="list-style-type: none"> <li>Limited and highly contextual environmental and cost-benefit data</li> <li>Limited monitoring, reporting and verification capabilities</li> </ul> | <ul style="list-style-type: none"> <li>Longer-term investment</li> <li>Uncertain demand/price premium for sustainable products</li> <li>Perverse fiscal incentives</li> <li>Low liquidity/barriers to exit</li> <li>Complex local stakeholder engagement</li> <li>Weak governance</li> <li>Technical risk specific to restoration (for example, uncertain restoration outcomes)</li> </ul> | <ul style="list-style-type: none"> <li>High upfront costs</li> <li>Positive externalities in restoration make it difficult to monetize restoration benefits/generate cashflows</li> <li>Time lag for financial returns</li> </ul> |

## The financial sector

**Although asset managers, hedge funds, endowments, and retail banks represent an untapped source of investment, they tend to have stringent requirements due to their fiduciary duty, regulatory requirements, and size, so limiting the pipeline of restoration opportunities they can invest in.** These investors seek asset classes and strategies that have an extensive track record, are well understood and standardized, and offer efficient risk-management tools. Institutional investors rarely invest directly in assets, especially in the alternative asset space. Instead, they tend to deploy capital through pooled investment vehicles, such as restoration funds. In a similar fashion, they expect the funds and investment teams to be seasoned and to have a significant successful track record. In the context of restoration opportunities, the in-house and external technical expertise tend to be limited. Figure 9 provides a summary of common barriers the financial sector faces when investing in restoration.

**The small size, localized nature, and complexity of restoration investments make them difficult to standardize and reduce their appeal for institutional investors.**

Restoring nature is highly contextual, in part due to the great diversity of geographies and ecosystems where restoration takes place. It can be complex to implement, due to varying abilities to abate environmental pressures driving degradation, including climate change, and the need to engage local stakeholders. Their (often small) size and heterogeneity make it challenging to standardize loan products or other financial instruments supporting restoration and increase transaction costs for potential lenders and other types of institutional investors.

**The structure and timing of the costs and benefits of restoration make the risk-return profiles of investments less competitive than other types of investments.**

The timeline for realizing the benefits of nature restoration often does not match traditional investment timelines. For example, silvopasture projects may have longer initial phases and payback periods than conventional agriculture. Combined with a lack of proven business models with steady cash flows, investment opportunities linked to restoration continue to be perceived as risky among traditional investors.

**Figure 9.** Common barriers to investment in restoration (financial sector and institutional investors)

| Limited awareness of restoration as an investment opportunity                                                                                                        | Lack of tools/data                                                                                                                                                                                                                                                                                                                                               | High perceived risk                                                                                                                                                                                                                                                         | Potentially low financial returns                                                                                                                                                                                                                                                                                                                                                             |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>Limited knowledge of bankable models</li> <li>Lack of staff with technical expertise or lack of available advisory</li> </ul> | <ul style="list-style-type: none"> <li>Lack of financial benchmarks</li> <li>Limited and highly contextual cost-benefit data</li> <li>Lack of credit/debit methodologies and standardized investment models</li> <li>Lack of sustainable finance taxonomies covering restoration</li> <li>Limited monitoring, reporting and verification capabilities</li> </ul> | <ul style="list-style-type: none"> <li>Longer-term investment</li> <li>Low liquidity/barriers to exit</li> <li>Complex local stakeholder engagement</li> <li>Uncertain environmental outcomes in restoration investments</li> <li>Lack of proven business models</li> </ul> | <ul style="list-style-type: none"> <li>Below-market returns in some restoration products due to challenges with monetizing restoration benefits</li> <li>Higher transaction costs due to small and location-specific projects/lack of standardization</li> <li>Higher transaction costs if blended finance/multiple investors are involved</li> <li>Time lag for financial returns</li> </ul> |



**In certain country contexts, for example those characterized by fragility, conflict, and violence (FCV), companies and investors considering restoration may face even higher risks and costs because of unique challenges on the ground.** Operating in FCV settings can expose companies and investors to rapidly changing circumstances, insecurity, fragile and volatile political situations, macroeconomic instability, low institutional capacity, a weak enabling and investment climate for the private sector, and significantly higher risks and costs of engagement (World Bank 2020b). As a result, such countries tend to receive lower levels of private foreign direct investment: while economies experiencing fragile and conflict-affected situations represent about 5.8 percent of the developing world's GDP, they receive only about 3.6 percent of foreign direct investment flows (World Bank 2022). Even if the restoration opportunities are vast—for example in countries such as Ethiopia and Burundi, where land degradation is widespread—attracting private finance to support restoration is a challenge due to factors that are not specific to restoration.



Credit: Shutterstock



## 3

# Emerging Solutions

**The case studies in this report demonstrate the financing solutions that overcome some of the most common barriers to private sector investment.** They capture a range of ecosystem types, business models and financial instruments (Table 7). The examples highlight projects implemented in North and South America, Africa, and South Asia (Figure 10), as well as a range of country income groups, from low- to high-income countries. In focusing primarily on developing countries and emerging market economies, the relevance of restoration in the development context is underscored. This chapter contains a brief summary of each of the case studies.

**Figure 10.** Case study locations

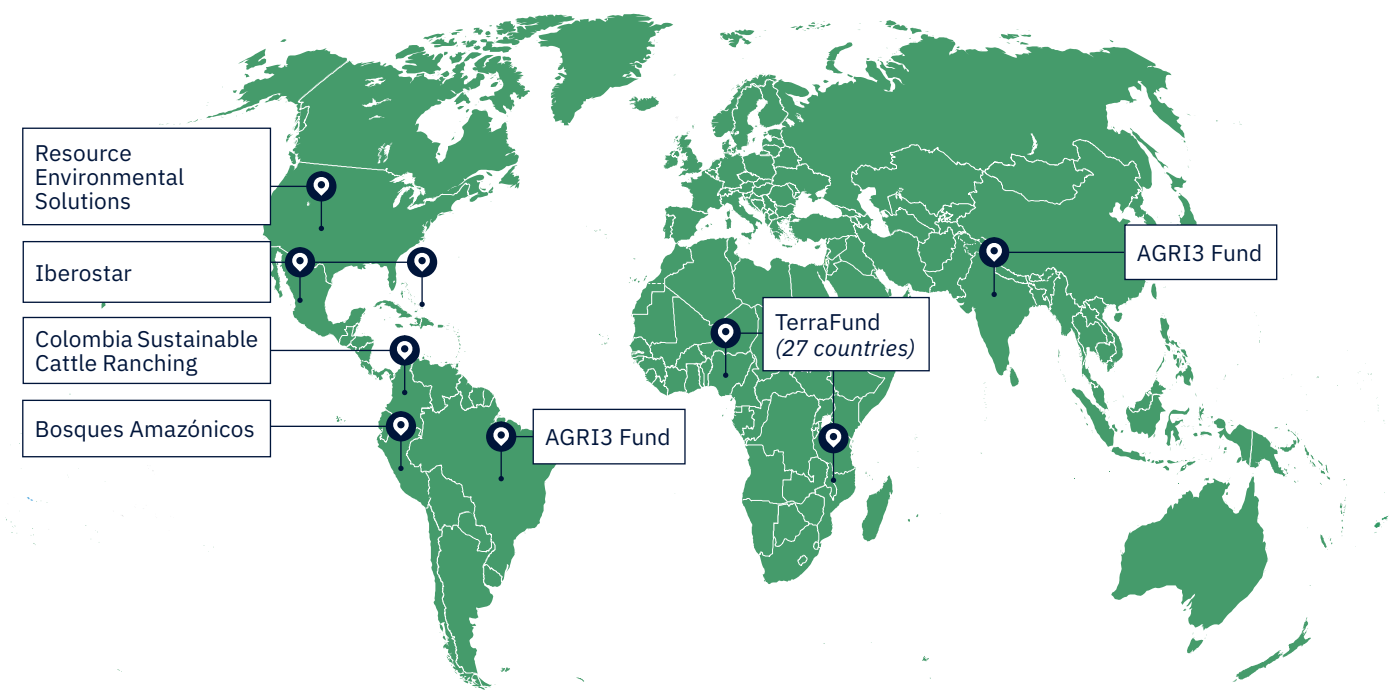












Table 1. Summary of the case studies

|  Case study name |  Geography |  Theme |  Investment drivers (private finance)                                                                         |  Financial returns |  Instruments                                     |  Investment size |  Barriers overcome                                                                                                                            |  Lessons learned/relevance |
|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| <b>1 TerraFund for AFR100</b>                                                                     | Africa (multiple countries)                                                                 | Forest landscape restoration                                                            | Corporate social responsibility/ catalytic philanthropy (investors)                                                                                                                            | Not applicable/ below market rate (investors)                                                        | <ul style="list-style-type: none"> <li>• Grants</li> <li>• Low interest loans</li> <li>• Equity investments</li> </ul>              | \$33 million deployed in total \$50,000–\$500,000 payout                                            | <ul style="list-style-type: none"> <li>• Lack of bankability of projects</li> <li>• High transaction costs for investors</li> <li>• Lack of data and tools (limited monitoring, reporting, and verification capacity)</li> </ul> | Fund connects philanthropic and impact investors with small community and SME-led restoration projects        |
| <b>2 Colombia Sustainable Cattle Ranching Project</b>                                             | South America (Colombia)                                                                    | Farmland; silvopasture (small cattle ranchers)                                          | Insetting; productivity gains (cattle ranchers)                                                                                                                                                | Not applicable/ below market rate (investors)                                                        | <ul style="list-style-type: none"> <li>• Payment for ecosystem services mechanisms</li> <li>• Grants</li> </ul>                     | \$49 million total cost                                                                             | <ul style="list-style-type: none"> <li>• High upfront costs</li> <li>• Low financial returns from restoration</li> <li>• Lack of technical know-how</li> </ul>                                                                   | Incentives and financing scheme for cattle ranchers to restore pasture                                        |
| <b>3 AGR13 Fund</b>                                                                               | South America (Brazil) and South Asia (India)                                               | Farmland; sustainable agriculture (large commodity producers)                           | <ul style="list-style-type: none"> <li>• Voluntary insetting; market access (producers)</li> <li>• Financial returns (investors)</li> </ul>                                                    | Below-market to market rate (investors)                                                              | Blended finance fund providing partial risk guarantees                                                                              | \$100 million capital base<br>\$3 million to \$15 million average payout                            | <ul style="list-style-type: none"> <li>• Lack of access to credit</li> <li>• High perceived lending risk</li> <li>• Lack of dedicated credit lines</li> </ul>                                                                    | Guarantees unlocking domestic lending for sustainable agriculture                                             |
| <b>4 Bosques Amazónicos</b>                                                                       | South America (Peru)                                                                        | Forest restoration and sustainable forestry                                             | <ul style="list-style-type: none"> <li>• Business opportunity (project developer)</li> <li>• Voluntary offsetting (buyers of carbon credits)</li> <li>• Diversification (investors)</li> </ul> | Market-rate (project developer; investors)                                                           | <ul style="list-style-type: none"> <li>• Voluntary carbon credits</li> <li>• Commercial papers and corporate green bonds</li> </ul> | \$50 million in equity                                                                              | <ul style="list-style-type: none"> <li>• Challenges with monetizing restoration benefits</li> <li>• Lack of access to credit</li> <li>• Local stakeholder engagement</li> </ul>                                                  | Capital markets financing upfront costs of forest restoration                                                 |

|  Case study name |  Geography |  Theme |  Investment drivers (private finance)                                                                                              |  Financial returns |  Instruments                               |  Investment size                |  Barriers overcome                                                                |  Lessons learned/ relevance                                           |
|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>5 Resource Environmental Solutions</b>                                                         | North America (USA)                                                                         | Wetlands, streams, protected species habitat                                            | <ul style="list-style-type: none"> <li>Regulatory obligation (buyer of offsets)</li> <li>Financial returns from sale of environmental offsets (project developer)</li> <li>Financial returns (investors)</li> </ul> | Market rate (project developer; investors)                                                           | <ul style="list-style-type: none"> <li>Regulatory offsets</li> <li>Private equity and debt for project development</li> </ul> | \$3 million to \$15 million per wetland mitigation bank<br>\$100 million for client-specific compensation projects | <ul style="list-style-type: none"> <li>Lack of market for restoration</li> <li>Technical risk for investors</li> <li>High transaction costs for investors</li> </ul> | Regulation-driven business model generating market returns and attracting large private equity investors                                                 |
| <b>6 Coastal restoration program at Iberostar</b>                                                 | Dominican Republic, Jamaica, Mexico                                                         | Restoration of coral reefs, mangroves, and coastal dunes                                | <ul style="list-style-type: none"> <li>Insetting for risk reduction</li> <li>Operational improvement/ cost reduction</li> <li>Business opportunity</li> </ul>                                                       | Not applicable/ below-market rate (resorts)                                                          | Company balance sheet investment                                                                                              | Initially funded at the corporate level                                                                            | <ul style="list-style-type: none"> <li>Lack of technical know-how</li> <li>Local stakeholder engagement</li> </ul>                                                   | Embedding restoration and nature-positive strategies in hospitality business for risk reduction and greater value proposition to customers and investors |

# TerraFund for the African Forest Landscape Restoration Initiative

|                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                  |                                                                                                                                                                                                                               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <b>Geography</b><br>Africa (multiple countries)                                                                                                                               |  <b>Theme</b><br>Restore forest landscapes                                                                                                      |  <b>Sources of finance</b> <ul style="list-style-type: none"> <li>• Public international</li> <li>• Impact and philanthropic finance</li> </ul> |  <b>Instruments</b> <ul style="list-style-type: none"> <li>• Grants</li> <li>• Low-interest loans</li> <li>• Equity investments</li> </ul> |
|  <b>Investment drivers (private finance)</b> <ul style="list-style-type: none"> <li>• Corporate social responsibility</li> <li>• Catalytic philanthropy (investors)</li> </ul> |  <b>Investment size</b> <ul style="list-style-type: none"> <li>• \$33 million deployed in total</li> <li>• \$50,000–\$500,000 payout</li> </ul> |  <b>Financial returns</b><br>Not applicable/below-market rate (investors)                                                                       |                                                                                                                                                                                                                               |

## Summary

### Context

Africa loses 4 million hectares of forests each year (Mansourian and Berrahmouni 2021). About 65 percent of productive land (including cropland) is degraded, and desertification affects 45 percent of the continent's land area (Archer et al. 2018). This degradation disproportionately affects rural communities. To tackle this degradation, 34 African governments have committed to restoring 100 million hectares of land by 2030 under the [African Forest Landscape Restoration Initiative](#) (AFR100).

### Barriers to investment in restoration

Communities manage nearly 70 percent of African land (Wily 2011). Rural communities, small and medium-sized enterprises (SMEs) and smallholder farmers often face precarious conditions and financial and technical barriers to implementing restoration or shifting to more sustainable practices. “Bankable” restoration projects are uncommon.

### The solution

[TerraFund](#) for AFR100 is a financing mechanism established to help channel AFR100 funding into local restoration efforts. TerraFund is a blended finance facility managed by the World Resources Institute, One Tree Planted, and Realize Impact (Figure 11). So far, the fund has pooled philanthropic funding from eight donors and impact investors, including the Bezos Earth Fund, Meta, the Good Energies Foundation, Lyda Hill Philanthropies, the DOEN Foundation, AKO Foundation, and The Audacious Project. The fund channeled \$26.4 million into small-scale forest landscape restoration via performance-based grants to 158 community-based nonprofits and \$6.6 million via low-interest loan finance to 34 agroforestry SMEs. TerraFund also offers capacity-building and a transparent project monitoring, reporting, and verification (MRV) system for its investees.

### Lessons learned and broader relevance

By managing a portfolio of small restoration projects, TerraFund reduces the transaction costs for investors. It also leverages economies of scale to provide MRV and technical capacity-building to the restoration projects, strengthening their impact and so reducing risks for investors. The grants and concessional loans provided fill the early-stage financing gap that restoration projects often face. Building on this, TerraFund is exploring opportunities to help investees expand activities that generate cash flow, which would attract commercial, return-seeking private financiers to the fund.

# Colombia Sustainable Cattle Ranching Project

|                                                                                                                                                                                                                                         |                                                                                                                                                                                             |                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <b>Geography</b><br><br>South America (Colombia)                                                                                                      |  <b>Theme</b><br><br>Farmland; silvopasture (small cattle ranchers)                                        |  <b>Sources of finance</b><br><br><ul style="list-style-type: none"> <li>• Public international</li> <li>• Philanthropic finance</li> <li>• Private finance</li> </ul> |  <b>Instruments</b><br><br><ul style="list-style-type: none"> <li>• Payment for ecosystem services mechanisms</li> <li>• Grants</li> </ul> |
|  <b>Investment drivers (private finance)</b><br><br><ul style="list-style-type: none"> <li>• Insetting productivity gains (cattle ranchers)</li> </ul> |  <b>Investment size</b><br><br><ul style="list-style-type: none"> <li>• \$49 million total cost</li> </ul> |  <b>Financial returns</b><br><br>Not applicable/ below market rate (investors)                                                                                         |                                                                                                                                                                                                                               |

## Summary

### Context

Up to 66 percent of the land used as permanent pasture in Colombia is degraded or no longer suitable for cattle ranching (World Bank 2021a). Silvopastoral models that incorporate trees and shrubs into pasturelands can help reverse this by reducing erosion and improving soil quality and water retention, thus increasing productivity and revenue generation.

### Barriers to investment in restoration

Incentives to shift to silvopasture are often weak. Ranchers lack the required technical know-how and face high upfront costs of shifting to silvopasture, particularly in intensive systems. Restoration may also offer limited financial returns.

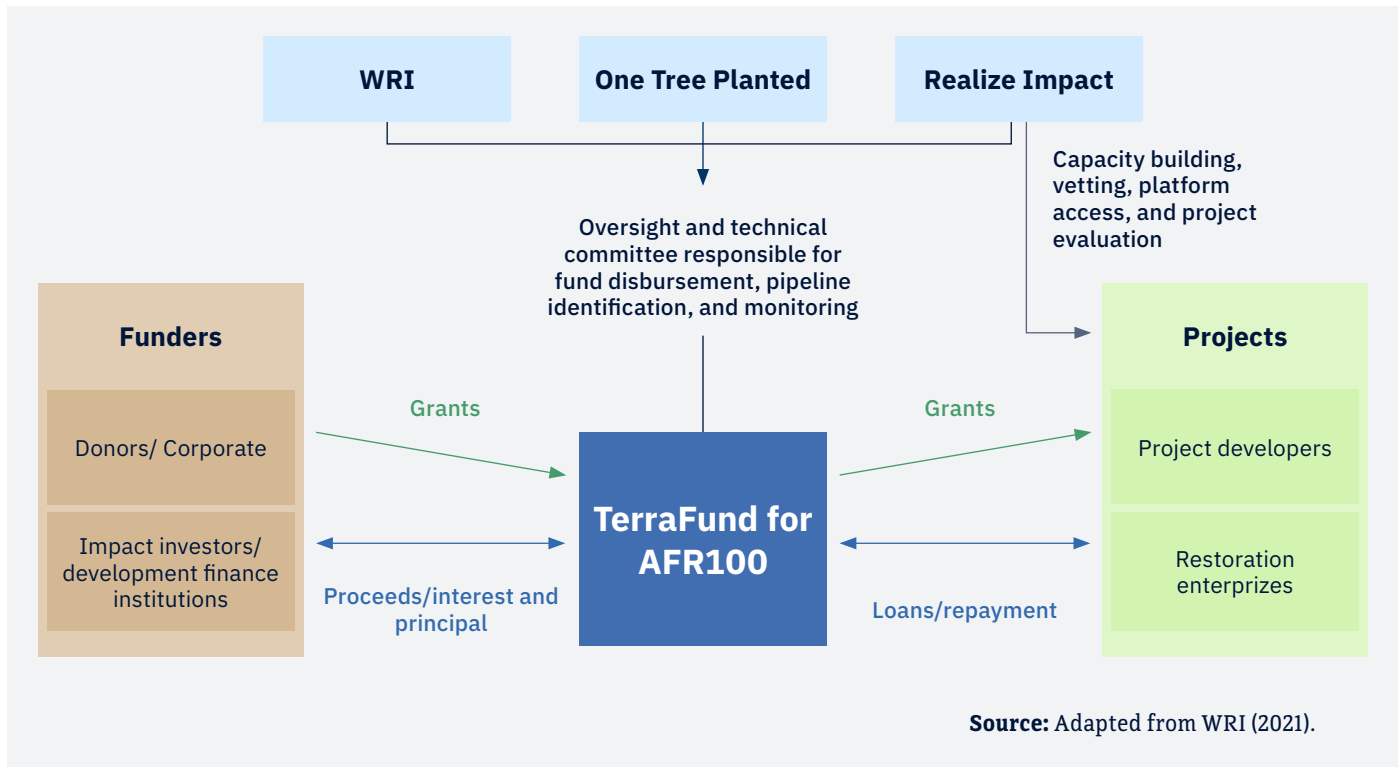
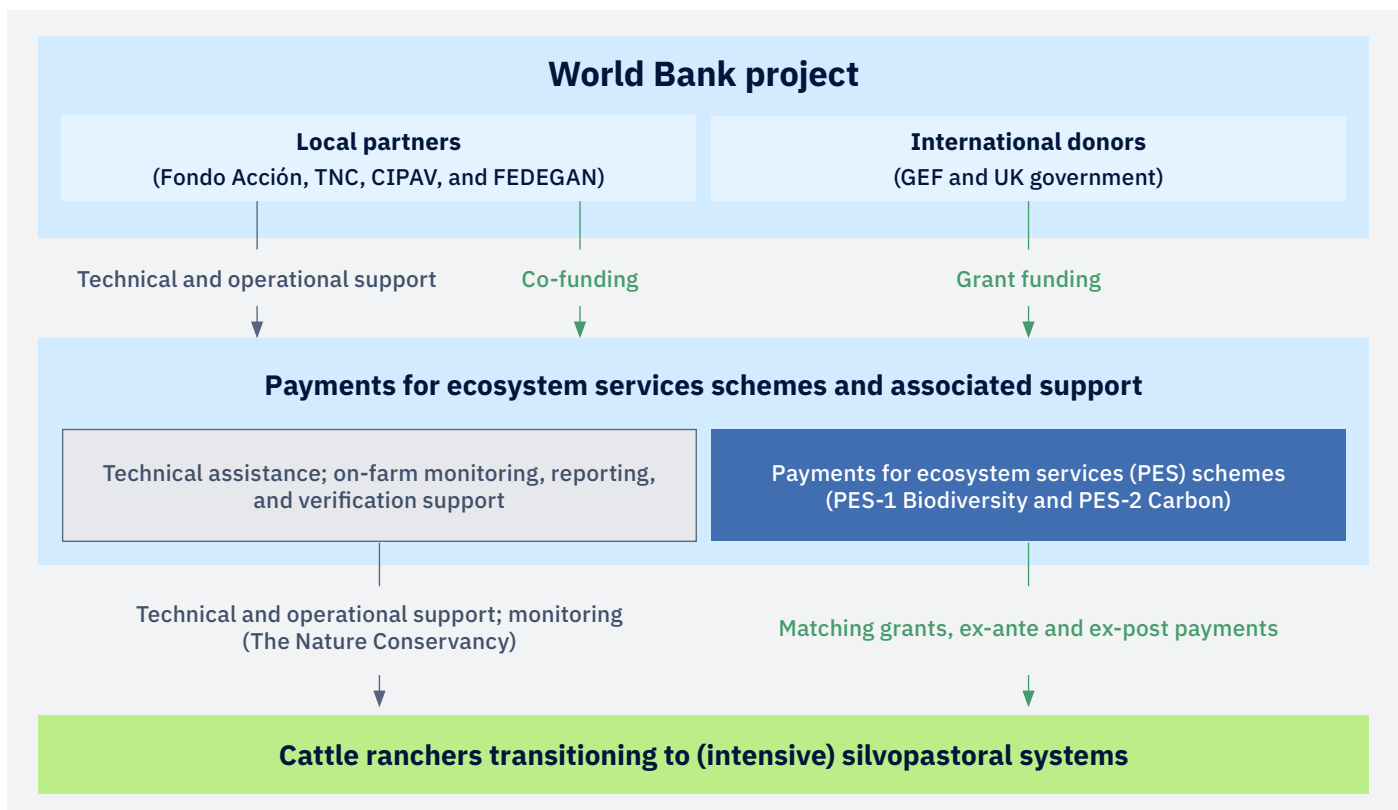
### The solution

The World Bank's Mainstreaming Sustainable Cattle Ranching project, which is funded by the Global Environment Facility, the United Kingdom, and local partners (Figure 12), supported the adoption of environmentally friendly silvopastoral systems across more than 100,500 hectares of land in five Colombian regions between 2010 and 2020. To incentivize this shift, two PES schemes focusing on biodiversity conservation (Biodiversity PES-1) and carbon sequestration (Carbon PES-2) provided grants to more than 3,300 and 1,300 cattle ranchers, respectively. Biodiversity PES-1 was a payment for results scheme that incentivized transition to non-intensive silvopastoral systems, where grants were tied to verified land-use changes. The Carbon PES-2 supported the transition to intensive silvopastoral systems through a mixed incentive that covered upfront costs and an ex-post payment after the land use change was verified. Cattle ranchers contributed more than \$22 million (over half of the total cost) under the two schemes. These contributions covered 68 percent of the total cost of the transition to silvopastoral systems and 50 percent of the total cost of the transition to intensive silvopastoral systems.








### Lessons learned and broader relevance

The PES schemes successfully closed financing and incentive gaps to motivate small cattle ranchers to restore pasture. The lessons learned through these pilot schemes have contributed to policy decisions (such the Colombia PES law and environmental compensation policy) with impacts at the national level (ONVS, 2021). The World Bank project continuously calibrated the financial solutions to match the cattle ranchers' evolving financing needs. "Soft" support was the key to success: the project provided technical assistance to fill in knowledge and technology gaps, established farm-based and project-based biodiversity monitoring and evaluation systems at the farm level, and facilitated multistakeholder engagements. The project demonstrated various biodiversity gains, including a 32 percent increase in bird populations within the project area.



**Figure 11.** Overview of TerraFund**Figure 12.** Overview of Colombia Sustainable Cattle Ranching Project

# AGRI3 Fund

|                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <b>Geography</b><br><br>South America (Brazil) and Asia (India)                                                                                                                                |  <b>Theme</b><br><br>Farmland; sustainable agriculture (large commodity producers)                                                                                  |  <b>Sources of finance</b><br><br><ul style="list-style-type: none"> <li>• Public international</li> <li>• Impact finance</li> <li>• Philanthropic finance</li> </ul> |  <b>Instruments</b><br><br><ul style="list-style-type: none"> <li>• Blended finance fund providing partial risk guarantees and liquidity instruments</li> </ul> |
|  <b>Investment drivers (private finance)</b><br><br><ul style="list-style-type: none"> <li>• Voluntary insetting; market access (producers)</li> <li>• Financial returns (investors)</li> </ul> |  <b>Investment size</b><br><br><ul style="list-style-type: none"> <li>• \$100 million capital base</li> <li>• \$3 million to \$15 million average payout</li> </ul> |  <b>Financial returns</b><br><br>Below- to market rate depending on the investment tranche                                                                            |                                                                                                                                                                                                                                                    |

## Summary

### Context

Thirty-four percent (or 1.66 billion hectares) of agricultural land around the world is already degraded (FAO 2021). Yet the total global food demand is expected to increase by 60 percent by 2050 against a 2010 baseline (van Dijk 2021). Restoring degraded farmland improves its efficiency, ensuring that agricultural supply chains are not interrupted while also reducing the pressure to expand the agricultural frontier.

### Barriers to investment in restoration

Agricultural commodity producers lack access to the credit needed to finance a shift to regenerative and sustainable agriculture. Domestic commercial banks often deem such projects to be riskier and less attractive, in that their proof of concept requires a longer time horizon.

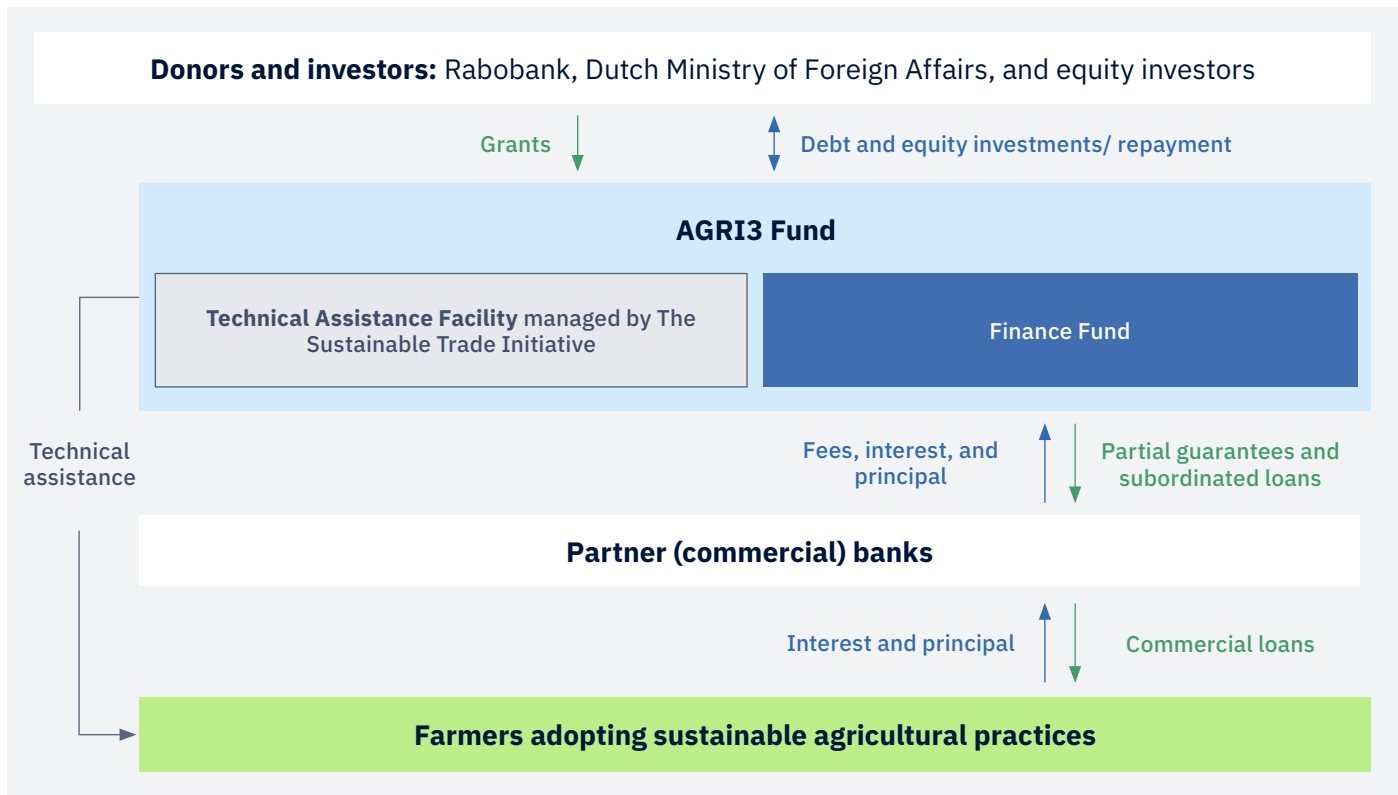
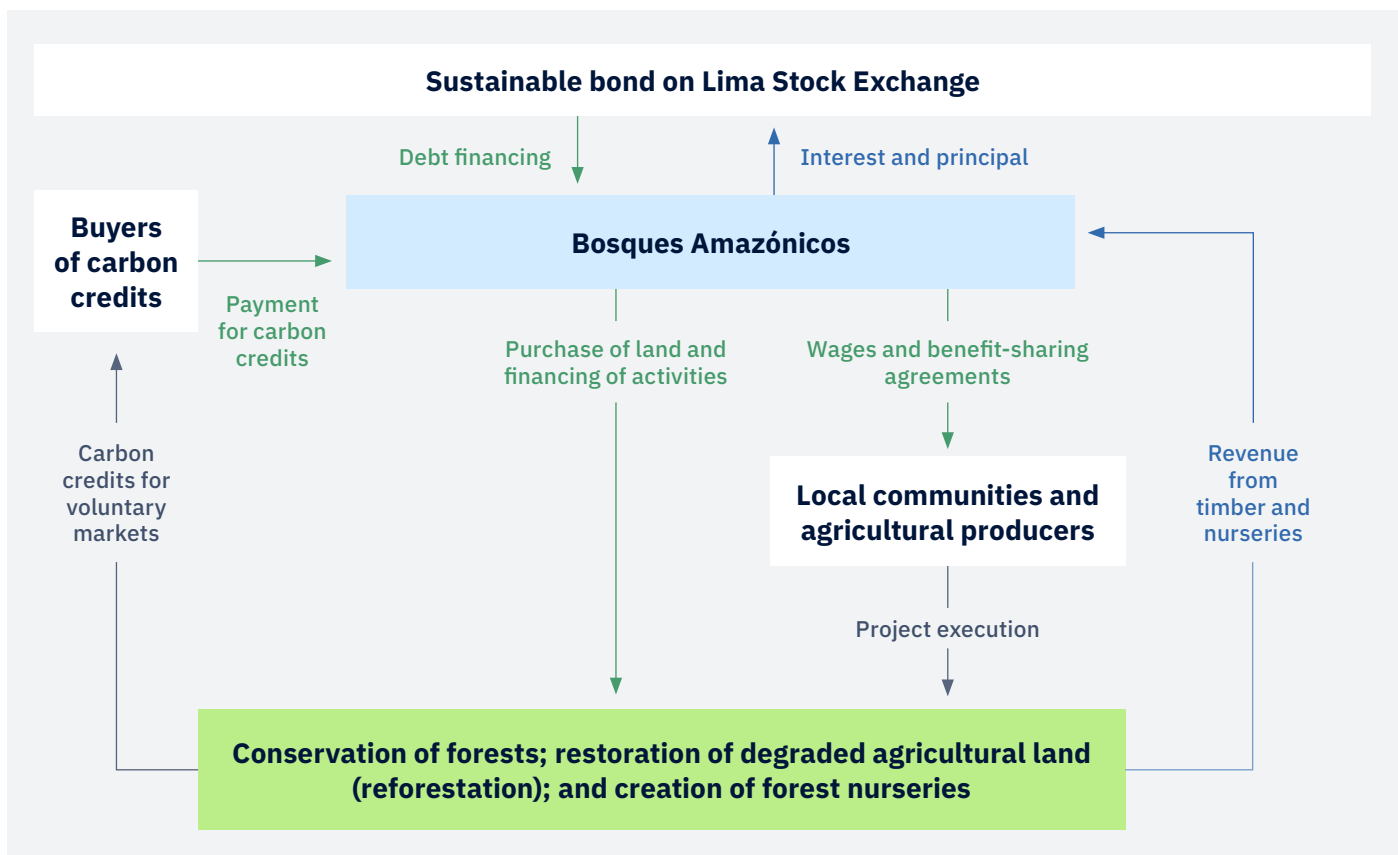
### The solution

[AGRI3 Fund](#)—a partnership between Rabobank and the United Nations Environment Programme—aims to unlock \$1 billion for regenerative and sustainable agriculture by providing credit enhancement tools (mainly partial loan guarantees) to commercial banks to finance sustainable agricultural projects. A layered financing structure includes the first loss tranche from donors (Dutch Ministry of Foreign Affairs) and a non-interest-bearing loan from the Global Environmental Facility, which allow the AGRI3 Fund to attract private, non-concessional funding through a debt tranche (Rabobank) and increase the capitalization of the fund.








The fund typically covers between 40 and 50 percent of the exposure on a loan provided by the commercial bank. The fund's typical contribution is between \$3 million and \$15 million to attract commercial loans of between \$5 million and \$50 million (with a typical loan size of between \$5 million and \$10 million). A technical assistance facility supports projects before and after investment to maximize their impact and mitigate environmental and social risks.

### Lessons learned and broader relevance

Domestic banks are instrumental in financing sustainable value chains. In addition to de-risking their investments, greater standardization of loan products would help reduce transaction costs and unlock more lending.

**Figure 13.** Overview of AGR13 Fund**Figure 14.** Overview of the Bosques Amazónicos model

# Bosques Amazónicos

|                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                            |                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <b>Geography</b><br><br>South America (Peru)                                                                                                                                                                                                      |  <b>Theme</b><br><br>Forest restoration and sustainable forestry                                          |  <b>Sources of finance</b><br><br><ul style="list-style-type: none"> <li>• Public international</li> <li>• Impact finance</li> <li>• Philanthropic finance</li> </ul> |  <b>Instruments</b><br><br><ul style="list-style-type: none"> <li>• Voluntary carbon credits</li> <li>• Commercial papers and corporate green bonds</li> </ul> |
|  <b>Investment drivers (private finance)</b><br><br><ul style="list-style-type: none"> <li>• Business opportunity (project developer)</li> <li>• Voluntary offsetting (buyers of carbon credits)</li> <li>• Diversification (investors)</li> </ul> |  <b>Investment size</b><br><br><ul style="list-style-type: none"> <li>• \$50 million in equity</li> </ul> |  <b>Financial returns</b><br><br>Market rate (project developer; investors)                                                                                           |                                                                                                                                                                                                                                                   |

## Summary

### Context

In some parts of Peru, deforestation and illegal logging have resulted in barren land and lost economic opportunities. Peru has pledged to restore 3.2 million hectares of degraded forests (Initiative 20x20 2023), but the efficacy of such initiatives varies and financing remains a constraint.

### Barriers to investment in restoration

Access to domestic finance for sustainable forestry is limited due to long payback periods and high perceived risk. The forestry sector is underdeveloped. Forestry operators find it challenging to cover the upfront costs of establishing a sustainable forestry business and monetize the benefits of forest restoration. Poor governance and security are also concerns in some regions of the country.





### The solution

Bosques Amazónicos S.A. (BAM) is a private company with a business model based on the conservation and restoration of the Amazon forest. BAM sells timber from its certified commercial forest plantations and generates carbon credits from restoration and forest conservation. In the Peruvian state of Ucayali, BAM's award-winning projects are restoring 18,000 hectares of degraded forest and pasture lands. BAM became the first forestry company to be listed on the Lima Stock Exchange (Bolsa de Valores de Lima), opening access finance at more competitive rates than those offered by domestic banks. BAM finances its operations via corporate green bonds and commercial papers issued on the Lima Stock Exchange. To date, the green corporate bond program has raised \$7.1 million via two placements, offering a yield of 9.7 percent. The engagement of local communities and academia is at the core of BAM's business model.

### Lessons learned and broader relevance

Forest restoration and conservation can be financed via capital markets and are commercially viable while still delivering positive environmental outcomes. Another lesson is that collaboration with local government and buy-in from local communities and producers are key to mitigating some of the business risks. Further development of voluntary carbon markets to enhance their transparency and integrity is needed to facilitate the scaling and replication of business models such as BAM.

# Resource Environmental Solutions

|                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <b>Geography</b><br><br>North America (USA)                                                                                                                                                                                                                                  |  <b>Theme</b><br><br>Wetlands, streams, protected species habitat                                                                                                                                             |  <b>Sources of finance</b><br><br><ul style="list-style-type: none"> <li>• Private finance (private equity, asset manager)</li> </ul> |  <b>Instruments</b><br><br><ul style="list-style-type: none"> <li>• Regulatory offsets</li> <li>• Private equity and debt for project development</li> </ul> |
|  <b>Investment drivers (private finance)</b><br><br><ul style="list-style-type: none"> <li>• Regulatory obligation (buyer of offsets)</li> <li>• Financial returns from sale of environmental offsets (project developer)</li> <li>• Financial returns (investors)</li> </ul> |  <b>Investment size</b><br><br><ul style="list-style-type: none"> <li>• \$3 million to \$15 million per wetland mitigation bank</li> <li>• \$100 million for client-specific compensation projects</li> </ul> |  <b>Financial returns</b><br><br>Market rate (project developer; investors)                                                           |                                                                                                                                                                                                                                                 |

## Summary

### Context

Even if development and infrastructure projects stringently follow the mitigation hierarchy—the steps to avoid, minimize and mitigate potential negative impacts on natural ecosystems—some will still have residual unavoidable adverse impacts that need to be offset. Mitigation banking originated in the United States in response to environmental laws (notably the 1972 Clean Water Act, the 1973 Endangered Species Act, and equivalent laws at the state level) requiring public and private projects to offset their unavoidable negative impacts on natural ecosystems, especially the habitats of endangered species and protected wetlands and streams. Environmental offsetting is not intended as a panacea to help countries halt and reverse nature loss. However, it is an entry point for directing private finance to ecosystem restoration, particularly where development impacts are unavoidable.

### Barriers to investment in restoration

Few public or private infrastructure projects will voluntarily compensate for damage to natural ecosystems, so environmental laws and regulations in the United States create an obligation. Because the obligation can be transferred to a third party, a market for environmental offsets (specifically relating to water and species habitat) has emerged for companies that specialize in nature restoration.

### The solution

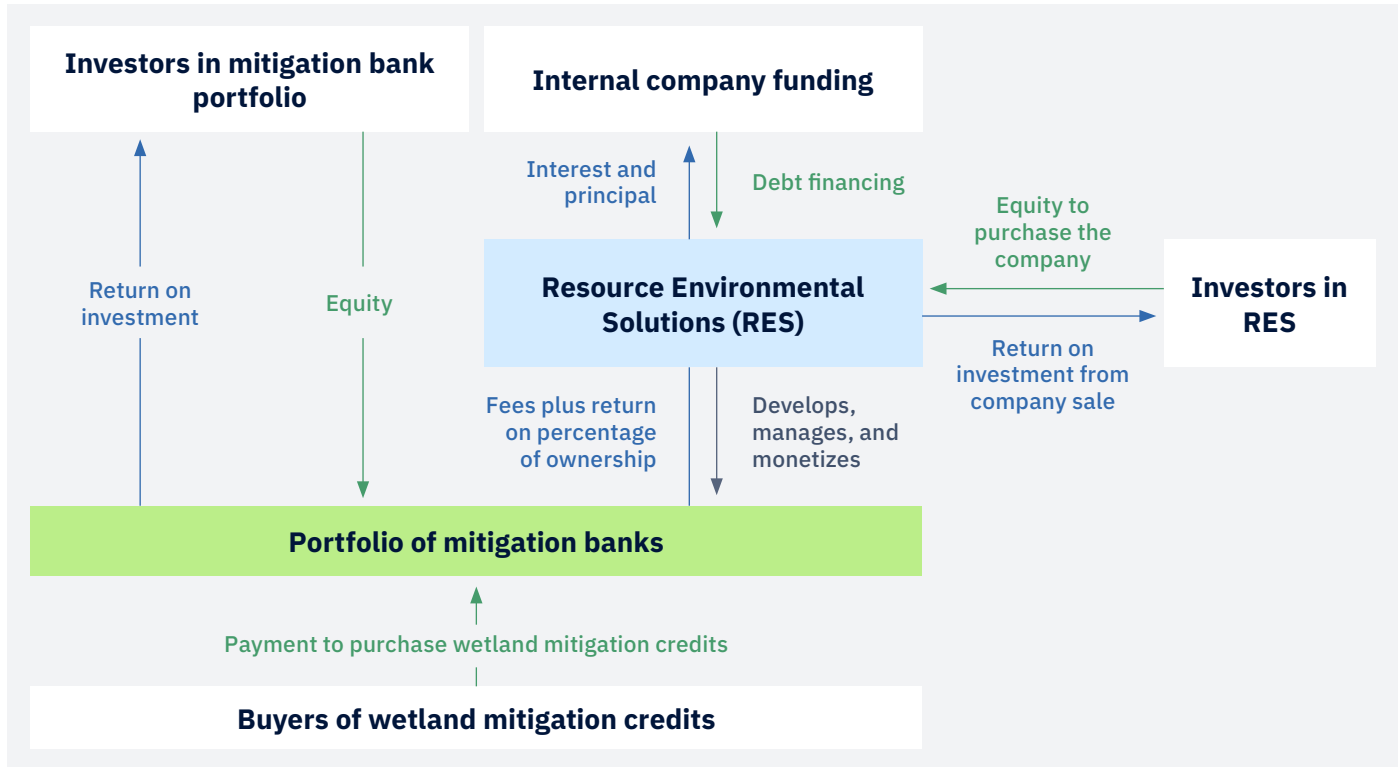
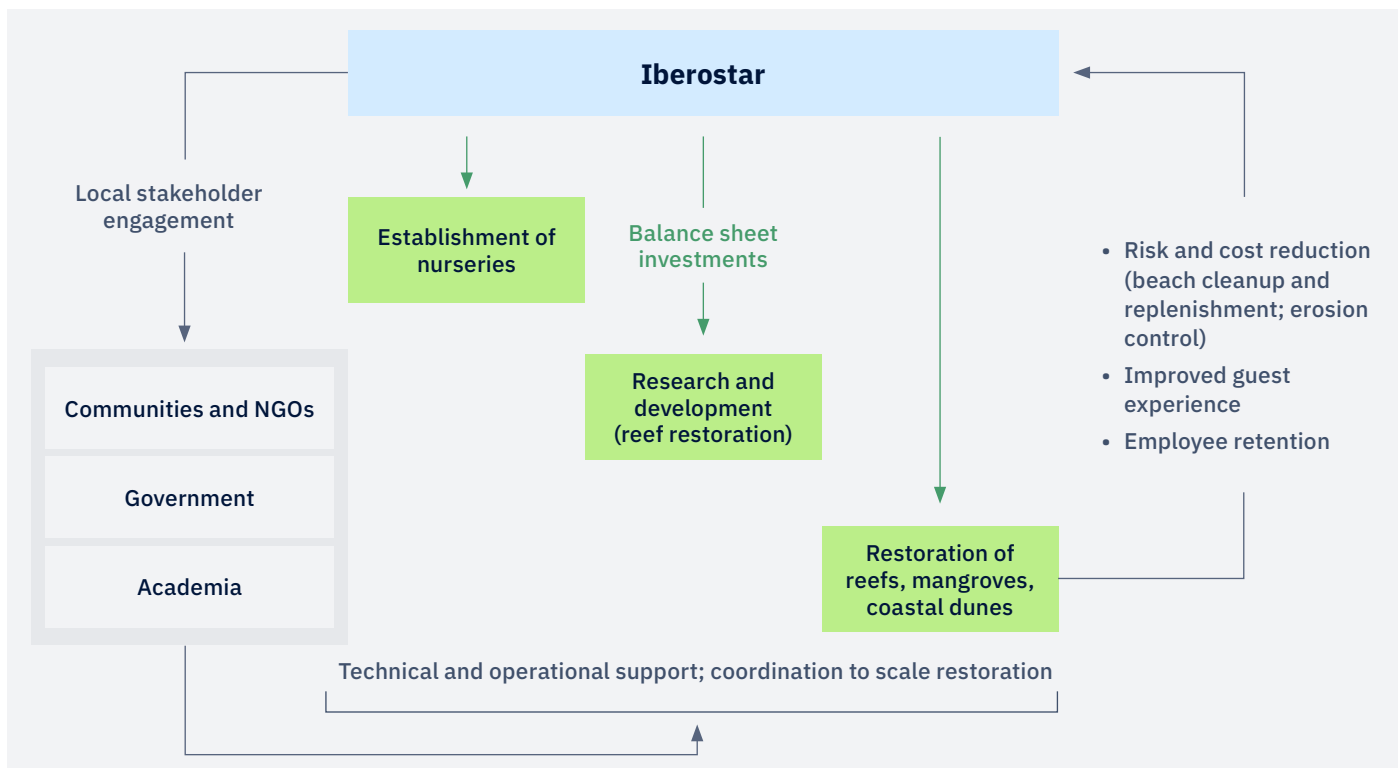
[Resource Environmental Solutions \(RES\)](#) is a private company that takes over the obligation for compensation from infrastructure developers. In return, RES develops and manages wetland, stream, and habitat mitigation banks and other compensation projects across the United States. Angel investors provided the company with early-stage risk capital when it was founded in 2007. Since then, RES has secured a series of private equity investments to finance the upfront costs of establishing mitigation banks, which typically require an investment of between \$1 million and \$15 million before mitigation credits can be generated and require at least two to five years before mitigation credits can be sold.

Recent projects RES supports include the Bois D'Arc Lake environmental mitigation project (total cost is estimated at over \$100 million), as well as the restoration of the Klamath river following the removal in January 2024 of four dams (total cost is estimated at \$450 million, with the dam removal accounting for the majority of the expense). In 2022, RES was acquired by two global private equity fund managers, Onex and KKR & Co.


### Lessons learned and broader relevance

A predictable regulatory environment is a requirement for a well-functioning environmental offsets market. Because standards are clearly defined and demand is more transparent, firms can develop specific expertise, specialize, and invest in nature restoration.



**Figure 15.** Overview of Resource Environmental Solutions**Figure 16.** Overview of Iberostar's coastal restoration program

# Coastal restoration program at Iberostar

|                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                             |                                                                                                                                                                                                    |                                                                                                                                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <b>Geography</b><br><br>Dominican Republic, Jamaica, Mexico                                                                                                                               |  <b>Theme</b><br><br>Restoration of coral reefs, mangroves, and coastal dunes                                              |  <b>Sources of finance</b><br><br><ul style="list-style-type: none"> <li>• Private finance (corporate)</li> </ul> |  <b>Instruments</b><br><br><ul style="list-style-type: none"> <li>• Company balance sheet investment</li> </ul> |
|  <b>Investment drivers (private finance)</b><br><br><ul style="list-style-type: none"> <li>• Insetting for risk reduction</li> <li>• Operational improvement and cost reduction</li> </ul> |  <b>Investment size</b><br><br><ul style="list-style-type: none"> <li>• Initially funded at the corporate level</li> </ul> |  <b>Financial returns</b><br><br>Not applicable/ below-market rate (resorts)                                      |                                                                                                                                                                                                    |

## Summary

### Context

Tourism contributes to more than 15 percent of the Caribbean's GDP, with most tourism activity occurring in coastal areas (Escovar-Fadul et al. 2022). However, coastal ecosystems are in sharp decline. Caribbean reef-building corals have declined by 50 percent since systematic reef monitoring began in the late 1970s (Cramer et al. 2020). This creates tangible risks and costs for hotel operations benefitting from these ecosystems. Reversing the degradation of these reefs, as well as that of mangroves and other coastal ecosystems, requires coordinated conservation efforts, innovation, and adequate financing from public and private sources.

### The solution

The Iberostar hotel chain exemplifies a private-sector-driven coastal restoration model. As part of its [Wave of Change](#) strategy, launched in 2023, Iberostar is restoring reef ecosystems, seagrasses, mangroves, and sand dunes across 12 resorts in the Dominican Republic, Mexico, and Jamaica. Efforts are focused on restoring ecosystem services that will reduce coastal risks (erosion and flooding) and enhance the beachfront. The restoration program is financed through Iberostar's corporate sustainability budget. The long-term goal is to incorporate the costs of restoration in each resort's budget and profit-and-loss statements. To be sustainable and effective, restoration efforts will need to include other stakeholders at the targeted locations. To this end, Iberostar has partnered with local governments, academia, other hotel operators, and development agencies to scale the work Iberostar is piloting.

### Barriers to investment in restoration

Reducing the pressures that drive the loss of coastal ecosystems is the first step to their recovery. This can be achieved through marine protected areas, transitioning to sustainable fishing practices, and improving water quality and waste management—all of which require coordination across sectors and between hotel operators, as well as engagement with local communities. Restoring coral reefs also requires investment in research and development (R&D), considering the climate vulnerability and slow growth rates of reefs. Planting or other active restoration approaches require technical know-how.

### Lessons learned and broader relevance

Iberostar demonstrates that the tourism sector can play a pivotal role in scaling up coastal restoration beyond the financing of projects. The long-term presence of hotel operators in seascapes, the interlinkages between their business and the health of local ecosystems, and their logistical networks and community connections make them well placed to directly participate in the scientific and operational processes of restoration and, in effect, become stewards of these natural assets. There is also the opportunity to monetize the restoration of coastal ecosystems through blue carbon credits or biodiversity credits.

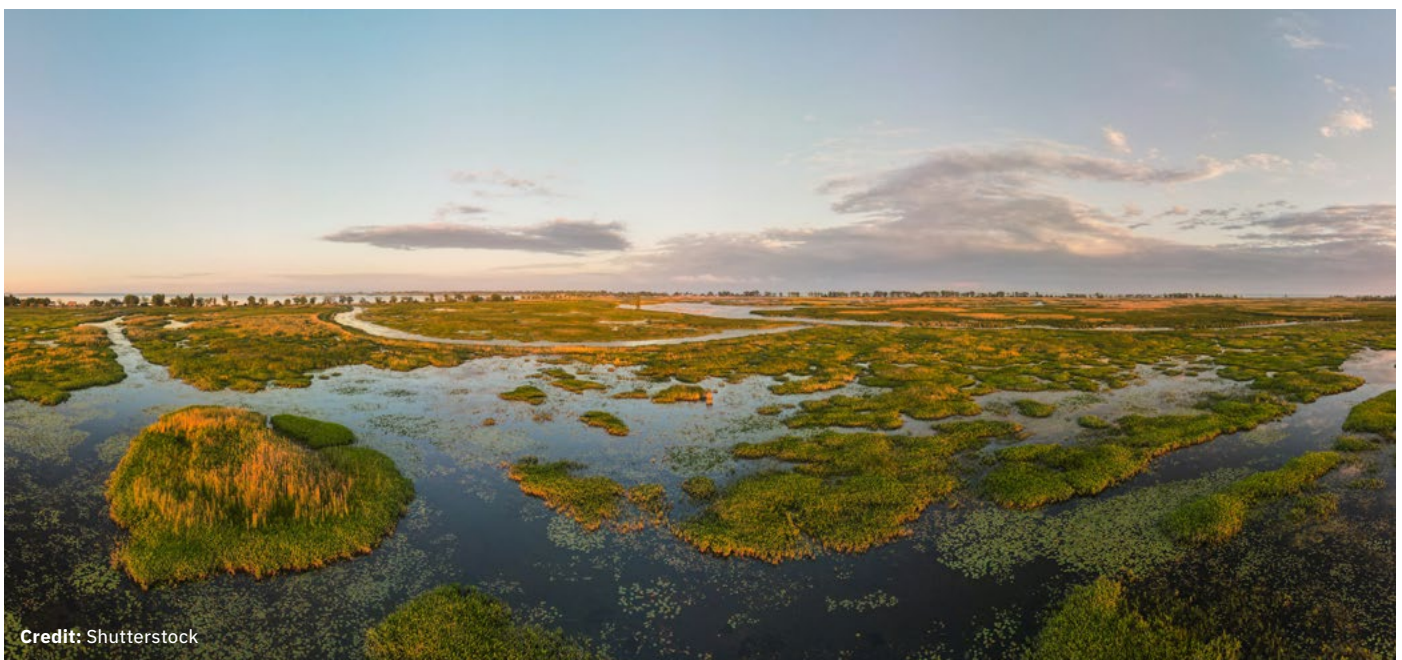
## 4

# Synthesis:

## Matching Solutions with Restoration Financing Needs

**There is a growing business case for investment in restoration, which is central to the global goal of halting and reversing nature loss.** Companies and investors are starting to see restoration as an avenue for achieving their net-zero targets, managing nature-related risks, and taking advantage of new business opportunities.

**The case studies in this report highlight several emerging commercially viable models and entry points for private finance.** The examples also highlight the factors that still limit the development of restoration markets. One such factor is the dearth of early-stage risk capital that restoration projects most need to get off the ground. The case studies acknowledge that non-financial factors and enabling conditions are also instrumental to the success of these models. Several targeted actions could be taken by governments, partners, investors, large corporations, and project developers to bring scale to restoration and better connect private finance with restoration projects.



Credit: Shutterstock

## 4.1

## Key lessons from case studies

### 1 For the private sector, restoration is a means to achieving net-zero targets, managing nature-related risks, and taking advantage of new business opportunities.

Improved understanding of nature-related risks and opportunities in value chains and investment portfolios, and the role of nature in net-zero targets (5) are some of the factors generating corporate and investor interest in restoration.

#### BOX 5.

#### Illustrating the drivers of private finance in restoration through case studies

The case studies showcase a range of investment drivers, stemming from considerations of nature-related risks and opportunities, or both.

These include:

##### → **Regulatory obligation.**

In the United States, private entities carrying out infrastructure projects with residual impacts on natural ecosystems, which are required to be offset under law, create demand for biodiversity credits and the establishment of wetland or habitat mitigation banks. The success of such banks hinges on stringent regulation to ensure predictable demand and market integrity (see Resource Environmental Solutions).

##### → **Voluntary offsetting or insetting for risk reduction.**

Demand for carbon credits generated by forest

conservation and restoration in Peru is coming from corporations such as LATAM airlines, Qantas airlines, and cosmetics company Natura, which have chosen to voluntarily offset their greenhouse gas emissions in line with corporate net-zero commitments (see BAM).

##### → **Corporate social responsibility and marketing claims.**

Catalytic grant funding from corporate and philanthropic donors such as the Bezos Earth Fund, Facebook, the Good Energies Foundation, and Lyda Hill Philanthropies seeks to achieve impact by financing small and medium-sized enterprise (SME) and community-led restoration initiatives in Africa (see TerraFund).

##### → **Operational improvement or cost reduction.**

Once given a financial incentive to restore, small and large agricultural producers can invest in recovering degraded pasture and shifting to silvopastoral systems to enhance productivity and

climate resilience at the farm level (see AGR13 Fund and Colombia Sustainable Ranching). In the hospitality sector, operators exposed to the risks of disappearing coastal ecosystems that underpin their value proposition are investing in restoration efforts to try to slow down and reverse this trend. Cost-effective nature-based solutions can be alternatives to gray infrastructure (see Iberostar).

##### → **Financial returns/ new revenue or business opportunities.**

Institutional investors such as KKR & Co., Onex, Rabobank, or buyers of green corporate bonds are capitalizing on the financial returns that investments in restoration can offer. Project developers and established businesses across in productive sectors, hospitality, and others also see business opportunities and new sources of revenue tied to restoration (see Resource Environmental Solutions, Bosques Amazónicos, Iberostar, and AGR13 Fund).

**2 Some commercial restoration-based projects and business models are emerging around sustainable agriculture and forestry, mandatory biodiversity offsets, and voluntary carbon markets, but the bankable pipeline remains small.**

While the benefits of restoration can be challenging to monetize, restoration can be a revenue-generating activity and offer sustained market rate returns over time, as demonstrated by the BAM and Resource Environmental Solutions (RES) case studies. Through its green corporate bond, which is listed on Lima's Alternative Stock Exchange, BAM has raised \$7.12 million to date. Relying on revenue from carbon credits, the sale of timber and seedlings from nurseries, it is able to offer a yield of 9.7 percent. RES' biodiversity offsets projects are expected to yield nominal internal rates of return of between 15 and 25 percent. The business has been acquired by two global private equity fund managers, Onex and KKR & Co. There is an important need to discover new profitable business models around ecosystem restoration and to scale and replicate those that have already proven successful.

**3 There is investor interest in—and potential capital available for—restoration. However, much of this is mature-stage capital and commercial debt, while what is needed most to get restoration projects off the ground is early-stage risk capital in the form of grants and early-stage impact investment.**

The largest pools of capital (institutional investors, large corporates and value chains, and large philanthropic funds) tend offer mature-stage capital, which is suitable for proven business models and bankable projects already under implementation. By contrast, restoration projects tend to be associated with the perception of high risks and poor returns, making it difficult to demonstrate commercial viability and expected cash flows, especially in the absence of well-functioning environmental markets and limited demand for sustainably sourced products. Early-stage risk capital is best suited to cover the upfront costs of the design and piloting of restoration-based projects and business models.

**4 For many restoration projects, the absence of early-stage funding to cover upfront costs is a significant barrier.**

For small agricultural producers, SMEs, and communities—especially in emerging market and developing economies—the upfront costs of restoration can be insurmountable (see TerraFund and Colombia Sustainable Cattle Ranching). These entities also often lack the technical know-how required. Limited access to finance and weak incentives can be a deterrent even for established businesses, including large agricultural producers, looking to integrate sustainable practices when the conditions are right (see AGRI3 Fund). In this context, lack of access to competitive financing can raise opportunity costs, preventing restoration from taking place at the scale and speed necessary.



## 5 Over time, restoration requires a continuum of capital providers—from early-stage grants and impact venture capital to private equity and debt providers—to match evolving financing needs (Figure 17).

Regardless of the stage and financing source, the financial solution needs to remain adaptive. The types of capital needed include:

### → Early-stage funding

Early-stage funding, particularly in the form of grants, plays a catalytic role in developing new business models or exploring how to replicate and scale them. In addition, grants can help kick-start restoration projects led by SMEs, smallholders, and community-led initiatives by supporting feasibility studies, project design, as well as the upfront costs of restoration and certification or monitoring, reporting, and verification (see TerraFund and Colombia Sustainable Cattle Ranching). Early-stage financing needs to be adaptive because the costs and barriers can be highly contextual (see Colombia Sustainable Cattle Ranching). Potential sources of finance include governments, philanthropic donors, and other partners. If available, internal funds and company balance sheets may fill in the early-stage financing gap (see Iberostar).

### → Blended finance and early-stage impact investing

These types of finance can crowd in commercial capital and help pilot innovative and bespoke models, improving their risk-return profile.

*In a blended finance vehicle*, concessional investors (public or philanthropic) may agree to take below-market returns to attract commercial debt or equity looking for market-rate returns in addition to impact (see AGR13 Fund). Blended structures may also involve concessional investors providing first loss guarantees, insurance, or design-stage grants (Convergence 2023). They may also support a grant-funded technical assistance facility. Such vehicles can de-risk restoration-based projects or business models and bring in commercial capital.

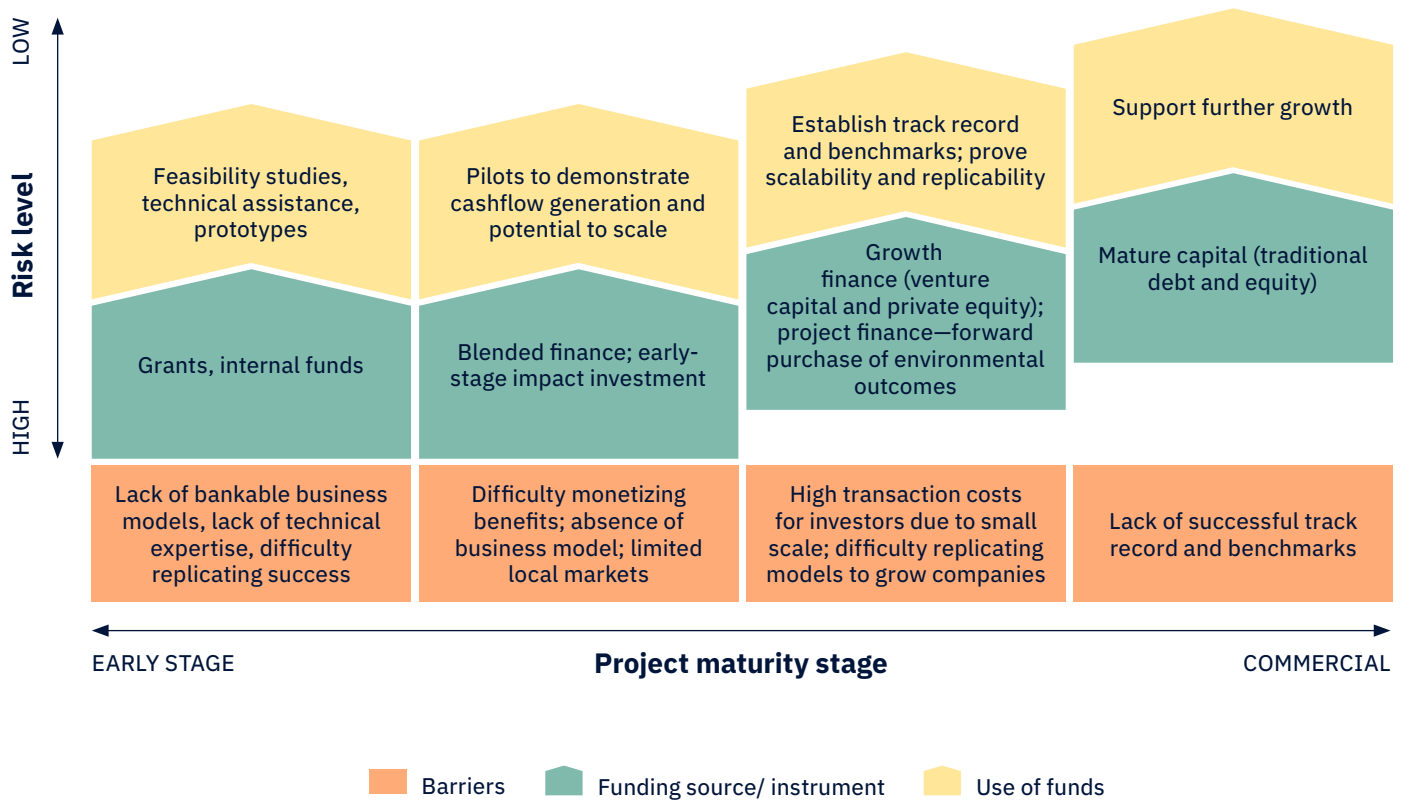
*Early-stage impact investing* could play a catalytic role by accepting higher risks or lower expected returns to jump-start a promising proof-of-concept restoration project that may, in time, demonstrate financial returns. Early-stage impact investors could include philanthropic foundations or private investors looking for impact first (for example, corporates could provide grants or concessional capital as part of their corporate social responsibility).

### → Growth finance

Can help restoration models scale and develop a track record. Venture capital, private equity, or project finance generated by the forward sale of environmental outcomes can all provide growth finance. Environmental markets, including environmental compensation and voluntary carbon markets, are an important revenue source for restoration projects.

### → Mature capital

Whether provided in the form of traditional debt or equity investments, mature capital seeks financial returns above all else. However, it can also bring scale.

**Figure 17.** Private finance mobilization at various stages of restoration project development

**Source:** Adapted from World Bank (2021b).

## 6 The presence of a portfolio manager or fund that aggregates multiple restoration projects along thematic or geographic lines reduces transactions for investors and connects them to small, localized projects.

Institutional investors, and even large corporates or philanthropic investors financing restoration projects, seek aggregated investment funds to avoid conducting due diligence on dozens of small, localized, and (potentially) geographically dispersed investment opportunities (see TerraFund). Aggregators can create economies of scale by focusing on a specific geography and strategy, so reducing the transaction cost for investors. Another key role they can play is delivering technical assistance. The presence of local partners is important for this, as well as continued monitoring of project implementation and their outcomes.

**7 Investing in *restoration* is different to investing in *conservation*. The benefits of restoration take time to accrue and the process is often technically complex, which translates to higher implementation risks and a greater need for accompanying technical assistance and R&D.**

Effective conservation can be challenging to achieve, particularly due to the presence of trade-offs associated with setting productive land- or seascapes aside for conservation purposes, and the need to address the drivers of nature loss. Restoration (which can be a combination of passive restoration resulting from conservation and natural regeneration, as well as active restoration measures) can demonstrate more immediate wins for the environment and economic actors when it helps recover foregone productivity and ecosystem services and is implemented with the buy-in from local stakeholders. However, successful restoration requires more technical know-how and support to overcome several key constraints, including:

- **Technical complexity.** Any successful restoration—whether of coral reefs, mangroves, forests, or soil on a farm—requires data and technical expertise to ensure that appropriate species are selected for planting, the design of mixed-used systems in agriculture is sound, and the project developers understand the pressures on an ecosystem that may undermine restoration outcomes. Success rates vary even when essential conditions are met, and outcomes can be difficult to predict due to various factors including climate change. For example, replanting coral reefs may prove futile if climate change accelerates faster than reefs are able to adapt. These challenges create the need for R&D and funding for the development of sound project design and technical assistance during implementation (see Iberostar). Because of this, restoration may be costly and have higher implementation risks.

Due to the complexity and risks involved, a technical assistance facility is often built into financial solutions to accompany investees during implementation and increase the likelihood of restoration success (see AGRI3 Fund and TerraFund).

- **Protracted timelines.** Restoration is by nature a results-oriented endeavor. In the case of wetland banking, for example, credits are released and available for sale over time as the ecosystem recovers and the bank meets its ecological milestones. It can take between two and 15 years from the start of the restoration project to the full release of wetland mitigation bank credits. This means that restoration projects need to return higher multiples of their investments than conservation projects.

## **8 Restoration projects often require support for the development of monitoring, reporting, and verification capabilities.**

Investors look for credible restoration outcomes. From an investor's point of view, this may require (i) developing some in-house MRV capacity or outsourcing it to monitor its investments – pay-for-performance metrics or key performance indicators are often used to track outcomes of investments in sustainable value chains (see AGRI3 Fund), and (ii) building MRV support into technical assistance to the restoration projects (see TerraFund). Offtakers of carbon credits generated by restoration also typically look for high-integrity and high-quality carbon credits with co-benefits for biodiversity and local communities.

## **9 Collaboration with local government and buy-in from local communities and producers are key to restoration success**

and for mitigating some of the business risks. Strong partnerships are critical for implementing restoration and for sustaining restoration outcomes. Engaging local stakeholders—government, academia, producer associations, or local communities—is a prerequisite for many restoration projects, including those embedded in mixed-use landscapes or those introducing incentives for change in the practices of economic sectors or communities (see BAM and Colombia Sustainable Cattle Ranching). This may require looking holistically at the land or seascape to identify entry points through which different stakeholders can create value and sustainability.

## **10 Voluntary carbon markets can be a significant source of revenue for ecosystem restoration projects. However, further market development is needed to enable models relying on carbon revenues to scale.**

The BAM case study demonstrates a revenue-generating model based on the sale of credits to voluntary carbon markets. Globally, an estimated 45 percent of the carbon credits available through voluntary carbon markets are nature-based solutions (Shah 2022). Of these credits, 98 percent are issued in the Global South. While voluntary carbon markets are critical for mobilizing resources for the pursuit of global climate and nature goals, today's market remains fragmented and complex. Project developers can face scrutiny over claimed emissions reductions and market participants still find it difficult to navigate various standards in different jurisdictions and to find high-quality carbon credits at transparent prices. Harmonization of international carbon credit standards and measures to enhance their transparency and integrity are needed to remove barriers to scaling up and replication of business models such as BAM's.

### **Restoration projects that rely solely on voluntary carbon markets are exposed to risks and may benefit from the diversification of revenue streams.**

Carbon prices fluctuate, creating uncertainty for project developers. Over-reliance on one source of revenue can also create a concentration risk for investors and make the investment less attractive. Even if operational and political risks are diversified through a portfolio of projects in different sectors and geographies, investors may be overexposed to risks linked to the carbon market. In addition, carbon credits monetize only some of the benefits of restoration. Their price is unlikely to reflect the full range and extent of the gains in biodiversity and ecosystem services.

### **11 Restoration at scale can only be achieved with strong policy signals.**

Land use decisions respond to a broad set of macroeconomic factors. Many of these factors lie outside of the project's control, particularly for restoration models that seek to incentivize a change in local producers or communities' behaviors. The case studies in this report demonstrate the potential to scale private investment in restoration through the following types of policies:

- **Policies that create economic incentives for value chains to incorporate restoration into their practices:** The establishment of environmental markets, for example through PES mechanisms (see Colombia Sustainable Cattle Ranching). In Colombia, the showcased pilot PES schemes incentivizing a shift to silvopastoral systems have informed law and helped to shape a national PES program.
- **Domestic regulation requiring environmental compensation:** In the United States, the mandatory environmental compensation market size for wetlands and streams is estimated to be \$3.5 billion (BenDor et al. 2023). Domestic regulation can support the establishment of mandatory markets for environmental restoration (see Resource Environmental Solutions).



## 4.2

## The way forward: Opportunities for scaling and replication

**Scaling up restoration and creating a vibrant market underpinned by private finance requires a holistic approach.** The Kunming-Montreal Global Biodiversity Framework sets out to achieve the global ambition of halting and reversing nature loss by 2030, with a view to full recovery by 2050,<sup>8</sup> through 23 global targets. These targets represent the broad range of transformative actions required to achieve the “nature positive goal”. Ultimately, scaling up private finance in nature requires a broad transition of economic activity away from harmful practices that drive nature loss and toward those aligned with the goal.

**The case studies presented in this report point to several targeted actions that could be taken by governments, partners, investors, large corporations, and project developers to bring scale to restoration and better connect private finance with restoration projects** (Box 6). These recommended actions support the two key action areas identified:

- **Increase availability of early-stage capital** in the form of grants and early-stage impact investments to help test innovative business models, kickstart restoration projects, and build their track records.
- **Establish targeted policy incentives for priority sectors** to incorporate restoration into their value chains and strengthen the market for restoration by mandating environmental compensation.



Credit: Kevin Dalferth

<sup>8</sup> The vision of the Global Biodiversity Framework is a world of living in harmony with nature where by 2050, biodiversity is valued, conserved, restored, and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people ([Convention on Biological Diversity 2022](#)).

## BOX 6.

## Key action areas

The following actions would support the scaling of private finance for restoration.



## Governments and policymakers

- ✓ **Provide grant financing** for early-stage or proof-of-concept business models (see for example the [Conservation Innovation Grants program](#) administered by the United States Department of Agriculture).
- ✓ **Develop incentives** for value chains to incorporate restoration into their operations. Such incentives could include establishing environmental markets through payment for ecosystem services mechanisms.
- ✓ **Establish or strengthen the regulatory framework** by requiring companies to compensate for their negative impacts on nature by applying the mitigation hierarchy, that is, avoiding, minimizing, and mitigating adverse impacts on nature, or offsetting residual impacts (see for example IFC's Performance Standard 6). This would support the creation of a mandatory environmental offsets market.



## Companies and value chains

- ✓ **Assess the costs and benefits of restoration.** Benefits would include productivity gains and reduced risks.
- ✓ **Leverage the value chain in priority sectors** such as food and beverages, forestry, and textiles to create incentives for suppliers to integrate insetting-driven restoration projects in their operations. Large companies can explore opportunities to establish a credit facility for suppliers meeting environmental key performance indicators.
- ✓ **Test new approaches locally,** leveraging local networks and resources to mobilize local stakeholders.



## Financial sector

- ✓ **Approach investment in restoration as start-up investments** and less as real asset investments, given that few mature restoration-based business models exist and many still need to be discovered.
- ✓ **Focus on early-stage investment vehicles** that seek to back new business models or new technologies related to restoration. Collaborate with domestic and international philanthropic and public capital providers to create blended finance structures and lower the risk of investing in early-stage ventures.
- ✓ **Develop sector-appropriate standardized lending criteria and loan products** suitable for more established restoration-based models to streamline origination, given that domestic commercial banks are instrumental to financing sustainable value chains. Collaborate with financial industry associations such as the Network for Greening the Financial System to share best practices.



## Partners (including development partners and philanthropic investors)








- ✓ **Look beyond traditional grantmaking** and use capital to support research and development or technical assistance to help discover and test new business models. As an example, program-related and mission-related investments could allow foundations to provide risk capital to private enterprises that develop new business models but do not have access to traditional finance.
- ✓ **Establish funds that aggregate multiple restoration projects** along thematic or geographic themes to connect them to investors. Build in technical assistance, including for monitoring, reporting, and verification.
- ✓ **Establish—or provide concessional capital to—blended finance vehicles** to crowd in commercial capital and help pilot and scale innovative and bespoke business models.

# Appendix:

## Full Case Studies

### A

## TerraFund for AFR100

|                                                                                                                                                                                        |                                                                                                                                                                                                     |                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                             |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <b>Theme</b><br><br>Forest landscape restoration                                                     |  <b>Geography</b><br><br>Africa (multiple countries, including Nigeria and Malawi)                                 |  <b>Sources of finance</b><br><br>Public international, impact, and philanthropic finance |  <b>Instruments</b><br><br>TerraFund deploys: <ul style="list-style-type: none"> <li>• Grants to community-based nonprofits</li> <li>• Low-interest loans (4 percent, on average) and equity investments to agroforestry SMEs</li> </ul> |
|  <b>Investment drivers</b><br><br>Corporate social responsibility/ catalytic philanthropy (investors) |  <b>Investment size</b><br><br>\$50,000 to \$500,000 per investment; \$33 million deployed in total (Phases 1 & 2) |  <b>Financial returns</b><br><br>Not applicable/below-market rate (investors)             |                                                                                                                                                                                                                                                                                                                             |

## Context

**Forest degradation leads to an estimated 3 percent loss of GDP each year across Africa** (Mansourian and Berrahmouni 2021). Between 2010 and 2020, Africa saw a net annual forest loss of nearly 4 million hectares (Mansourian and Berrahmouni 2021). Degradation is widespread outside of forests too:<sup>9</sup> 65 percent of productive land (including cropland) in Africa is degraded, and desertification affects 45 percent of the continent's land area. Africa spends more than \$35 billion on food imports annually because of this (Archer et al. 2018). The effects fall disproportionately to small farmers and rural households whose livelihoods depend on healthy soils, clean water, and the ability to withstand the effects of climate change.

**Forest landscape restoration in Africa faces a financing gap.** Public and donor finance dominates, with significant financing for restoration in Africa having been pledged by development partners (World Bank 2021c). However, a financing gap persists (Mansourian and Berrahmouni 2021). Given that communities manage nearly 70 percent of African land

<sup>9</sup> The combination of forest loss, climate change and poor management of agricultural lands leads to soil and nutrient depletion on productive land (AFR100 2022b).

(Wily 2011), private funding remains low. Many smallholder farmers and rural households lack access to finance, and bankable restoration projects are not common. Other common barriers are lack of capacity among project proponents to monitor restoration results—a prerequisite before many investors will commit more financing (Arakwiye et al. 2021), and lack of technical understanding of restoration approaches.

## Project description

**Launched in 2015, the [African Forest Landscape Restoration Initiative \(AFR100\)](#) is a partnership of 32 African governments that aims to restore more than 100 million hectares of land by 2030.** To date, 128 million hectares have been pledged for restoration. AFR100 contributes to several regional and global commitments, including the Bonn Challenge and the African Union’s Agenda 2063, and complements other restoration pledges such as the Pan-African Agenda on Ecosystem Restoration for Increased Resilience and the Great Green Wall initiative in the Sahara and the Sahel (World Bank 2021e).

**AFR100 focuses on forest landscape restoration**, an all-encompassing approach that extends beyond tree-planting to include returning trees and forests—and with them the vital ecosystem services they deliver—to landscapes where they have been lost. It is a country-led effort implemented with the support of a coalition of technical and financial partners.

The model successfully blends catalytic philanthropy with funding from public and private international sources. It involves two phases:

- Phase 1:** AFR100’s [financial partners](#) (which include bilateral and multilateral donors such as The World Bank, Global Environment Facility, Germany’s Ministry for Economic Cooperation and Development, the Swedish International Development Agency, and others) and private sector partners (which include NatureVest, SouthBridge Investments, and others) committed \$1 billion of financing.
- Phase 2:** At the Sharm el-Sheikh Climate Change Conference (COP27) in 2022, AFR100’s financing partners committed to establishing a \$2 billion fund that blends \$500 million of concessional finance with \$1.5 billion of private investment (in the form of debt, equity, offtake agreements, and carbon finance) to build local capacity and make finance available for communities and entrepreneurs restoring land (AFR100 2022a). These partners include SouthBridge Investments, the Bezos Earth Fund, and the Arab Bank for Economic Development in Africa, One Tree Planted, Good Energies Foundation, Lyda Hill Philanthropies and Meta.

**AFR100 enables small restoration efforts by working at the local level and focusing on unlocking access to finance and providing dedicated technical assistance.** Key goals of AFR100 include catalyzing the market for locally led restoration using instruments such as debt, and guarantees, while also playing a broader enabling role through technical assistance, planning and coordination, and monitoring capabilities. The success of the initiative depends on incentivizing rural communities and small and medium-sized enterprises (SMEs) to engage in restoration. These communities, which are often the most impacted by degradation, are also the ones that face precarious conditions and financial and technical barriers to shifting to more sustainable practices (Mansourian and Berrahmouni 2021).

**More than 40 AFR100 technical partners support the implementation of restoration activities throughout the continent.** Each of these technical partners works with entrepreneurs and community-based organizations in the partner countries. In Malawi, for example, AFR100 supports entrepreneurs that engage in beekeeping, honey production, and shade-grown coffee. It also provides microloans to small farmers. In Rwanda, food producer Shekina provides technical assistance to women on cassava cultivation, while the World Agroforestry Centre provides farmers with support and training to incorporate trees and shrubs into their agricultural systems in order to reduce soil erosion and create shade, among other benefits.

## The financial solution

**TerraFund for AFR100 is one of the financing mechanisms established to help channel funding provided in support of AFR100 into small-scale, locally led restoration efforts.** Launched in 2021, TerraFund is a blended finance facility managed by the World Resources Institute, One Tree Planted, and Realize Impact (see Figure 11 on page 23). To date, it has deployed \$15 million of project capital to forest landscape restoration under Phase 1 of AFR100 by pooling philanthropic funding from eight donors, which include the Bezos Earth Fund, Facebook, Good Energies Foundation, Lyda Hill Philanthropies, AKO Foundation, and the DOEN Foundation. TerraFund's call for proposals launched in 2021 and offered investment of between \$50,000 and \$500,000 to the top 100 forest landscape restoration initiatives across Africa. It attracted more than 3,200 applicants in two weeks.

**The fund uses two key channels: performance-based grant finance, which is provided to community-based nonprofits, and low-interest loan finance, which is provided to agroforestry SMEs** (Table A1). The grants are paid in tranches and are conditional on the achievement of key performance-based indicators at each stage of project implementation. After closing its second round of investments in January 2024, focused on three landscapes, TerraFund has so far delivered \$26.4 million in grant finance to 158 nonprofit projects, and \$6.6 million in debt and equity finance to 34 for-profit (restoration SME-led) projects.



**Table A1. Key pathways**

| Small and medium-sized enterprises                                                                                                                                                                                                                                                                                                                                                                                                 | Community organizations                                                                                                                                                                                                                                                                                             |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• For-profit business in food, agriculture and forestry sectors, incorporating tree planting to generate additional revenue (for example via carbon credits)</li> <li>• Seek low-interest loans (4 percent, on average)</li> <li>• Size of loans and equity investment ranges between \$50,000 and \$500,000 (average \$150,000)</li> <li>• Engages 900 smallholders on average.</li> </ul> | <ul style="list-style-type: none"> <li>• Nonprofit community organizations that aim to restore degraded habitat through indigenous tree planting or agroforestry to grow rural income</li> <li>• Seek grant investments</li> <li>• Size of grants ranges from \$50,000 to \$500,000 (average \$150,000).</li> </ul> |

Source: WRI (2022).

**The first two phases are expected to help restore more than 67,000 hectares of forest landscapes** by planting more than 29 million trees across 192 projects and enterprises in 27 African countries. Box A1 provides examples of projects financed in Nigeria and Malawi.

**Leveraging economies of scale, TerraFund offers capacity-building and transparent project monitoring, reporting, and verification to the community-based projects and enterprises it supports.** It tracks the number of trees grown, hectares restored, jobs created, carbon sequestered, and other indicators for each funded project. The system uses field data and satellite analyses with independent verification to carefully measure progress. Support with monitoring, reporting and verification is instrumental to help scale TerraFund and allow enterprises and communities to tap into voluntary carbon markets.

**BOX A1.****TerraFund's investments in Nigeria and Malawi****Nigeria**

TerraFund selected five community projects were selected in Nigeria in 2022: the African Research Association Managing Development in Nigeria, the International Institute of Tropical Agriculture, the Nigerian Conservation Foundation, Powerstove Offgrid Electricity Limited, and Aerobic Agroforestry Limited. Each community project has a distinct focus and is working to reduce deforestation and support active restoration efforts. For example, Aerobic Agroforestry

Limited, the largest nursery in Nigeria, works to restore 1,500 hectares by planting more than 750,000 trees. Powerstove Offgrid Electricity Limited works to provide rural households with clean cookstoves, while providing these households with wood pellets and tree seeds to replace trees used for charcoal production. To date, Powerstove has restored more than 2,000 hectares by working with rural households.

**Malawi**

Malawi had two community projects that received TerraFund investment in 2022. Wells for Zoë aims to provide communities in northern Malawi with clean drinking water by restoring

the ecosystems that naturally filter water and reduce sedimentation in waterways. TerraFund's support will enable Wells for Zoë to implement an agroforestry system in Hanock Beza to improve water quality and provide jobs and food to the community. The Wildlife Action Group manages two forest reserves in Malawi. The organization uses a variety of approaches to improve forest management, including beekeeping, improving vegetable gardens, tree-planting, and goat-lending initiatives. TerraFund's support will enable the Wildlife Action Group to strengthen its enforcement and monitoring capacity to improve forest management (TerraFund for AFR100 2023).

## Risks

TerraFund's investments face risks related to political instability, lack of secure land tenure, climate change, and potential devaluation of currencies in countries where TerraFund invests.



## Lessons learned and broader relevance

**TerraFund demonstrates the demand for, and added value of, financing mechanisms that act as aggregators or portfolio managers that connect international capital flows with small-scale and localized restoration initiatives.** Many local restoration initiatives are not bankable because they lack scale, sufficient data, and established business models to access international finance. In turn, large investors—even those not seeking a return—may have limited geographic reach, lack the local context and restoration-relevant sector expertise, and face prohibitive transaction costs if they consider such small-scale investments. This creates a disconnect between the pipeline of small-scale and localized projects and international finance. The restoration sector is currently underinvesting in portfolio management and the TerraFund example illustrates how small restoration initiatives can be aggregated along thematic or geographic themes to improve their access to finance. According to the World Resources Institute, only 10 out of 100 enterprises and communities that have received funding from TerraFund in Phase I had prior access to international finance.

**TerraFund is also exploring opportunities to grow the share of return-seeking private capital.** Building on the established financial architecture; monitoring, reporting, and verification systems; and network of partners supporting local capacity-building TerraFund's goal is to increase the share of its portfolio that is financed by financial markets to 30 percent in coming years, so diversifying funding streams. To do so, TerraFund is exploring ways to grow the portion of return-generating activities in the businesses it supports, including through carbon credits. To this end, it is helping enterprises identify opportunities to scale their businesses and maximize upstream or downstream offtake potential. A strong coalition of donors, investors, and technical partners will still be needed to overcome the complexity of restoration challenges on the ground and help scale this model.

## B

## Colombia Sustainable Cattle Ranching Project

|                                                                                                                                                                   |                                                                                                                                                     |                                                                                                                                                                             |                                                                                                                                                                          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <b>Theme</b><br><br>Sustainable cattle ranching; transition to silvopasture     |  <b>Geography</b><br><br>South America (Colombia)                  |  <b>Sources of finance</b><br><br>Public international, philanthropic, and private finance |  <b>Instruments</b><br><br>Payment for ecosystem services mechanisms; matching grants |
|  <b>Investment drivers</b><br><br>Insetting productivity gains (cattle ranchers) |  <b>Investment size</b><br><br>\$49.4 million (total project cost) |  <b>Financial returns</b><br><br>Not applicable/below market rate (investors)              |  <b>Time horizon</b><br><br>10 years                                                  |

### Context

**Cattle ranching is both economically and culturally important in Colombia, but it is also a significant driver of environmental degradation.** Cattle ranching generates 28 percent of agricultural GDP in Colombia and accounts for about 80 percent of agricultural lands (World Bank 2021a). Conversion of forest patches to pasture is a common method of obtaining a formal land title by demonstrating possession of the land and its productive use (Clerici et al. 2020). Nationally, cattle ranching is therefore a major driver of deforestation, particularly in heavily forested areas (Vanegas-Cubillos et al. 2022). Colombia lost nearly 3.2 million hectares of forests between 2001 and 2021 (IDEAM 2022), at least 89 percent of it through illegal practice (Dummett et al. 2021). In addition, the livestock sector contributes to 15 percent of the country's greenhouse gas emissions, deforestation excluded (World Bank 2023a).

**Consistently high rates of deforestation have been intertwined with low agricultural productivity** (World Bank 2023a). Up to 66 percent of the Colombian land used as permanent pasture is degraded or unsuitable for cattle ranching (World Bank 2021a). As a result of this low productivity and weak law enforcement, the 71 percent increase in agricultural production between 2001 and 2021 (World Bank Open Data 2022) mainly occurred by expanding the area under production (MADR 2019) at the expense of forests and other natural ecosystems.

**Silvopastoral systems can enhance land productivity by restoring ecosystems.**

Silvopasture incorporates trees and shrubs into grass and other types of fodder that dominate traditional pasturelands (World Bank 2021a), contributing to enhanced productivity of pasturelands (Tapasco et al. 2019), improved soil quality and water retention, reduced soil erosion, and alternative sources of income (World Bank 2021a).

**Despite the benefits offered by silvopastoral systems relative to traditional cattle ranching, uptake has been slow.** Converting traditional ranching to silvopastoral systems can be costly, and many farmers lack the financial resources, technical know-how (Tapasco et al. 2019), and incentives to make the change. There is also a lag between adoption of silvopastoral system and profit, and farmers typically lack access to credit to cover the upfront costs (World Bank 2018). There are also cultural barriers to implementing silvopastoral systems, in that ranchers traditionally view cattle pastures with trees as less productive.

**Project description**

**Between 2010 and 2020, the World Bank's Mainstreaming Sustainable Cattle Ranching in Colombia project supported the adoption of environmentally friendly silvopastoral systems across more than 100,500 hectares of land in five Colombian regions.** About 2,000 small and medium-sized cattle ranchers benefited from this support across five regions (namely, the Cesar river valley; adjacent lower Magdalena River Basin in the western part of Atlántico Department; Boyacá and Santander; the low foothills of southern Meta; and the coffee production ecoregion). These regions were chosen for their high biodiversity value, reliance on and experience with cattle ranching, and relatively low levels of conflict and displacement.

**Providing comprehensive support to farmers was key to achieving these results.**

The project established incentives for cattle ranchers to shift to silvopasture; provided technical assistance to fill knowledge and technology gaps; established monitoring and evaluation systems at the farm level; and facilitated multistakeholder engagement. Individual cattle ranchers were chosen based on their interest and ability to provide proof of land ownership.

**To close financing and incentive gaps, the project established two PES schemes (Box B1) focusing on biodiversity conservation and carbon sequestration:**

#### → **The PES-1 Biodiversity scheme**

which promoted biodiversity and the provision of ecosystem services, enrolled about 2,000 farmers covering 60,000 hectares of land. Eligible farms could qualify for short-term payments tied to voluntary changes in land use in accordance with their PES contract. Nearly 40,000 hectares demonstrated improved land-management practices, while almost 21,000 hectares were converted from traditional pasturelands to pasturelands with trees, live fences, and windbreaks.

#### → **The PES-2 Carbon scheme**

which focused on incentivizing small and medium-sized producers to transition to intensive silvopastoral systems, enrolled about 1,300 farmers and supported the implementation of intensive silvopastoral systems on more than 4,600 hectares of pastureland.

**These PES mechanisms built on a regional PES pilot involving Colombia between 2003 and 2008, which proved to be effective in incentivizing the scaling of silvopastoral systems in cattle ranching.** Pilot participants changed their land usage patterns in about 50 percent of cases, against 13 percent for those that did not receive PES (World Bank 2010). The two new PES programs were administered by Fondo Acción (financial management), monitored by The Nature Conservancy, and supported technically by the Colombian Center for Research on Sustainable Agricultural Production Systems and the Colombian Cattle Ranching Association.

**Both PES programs had positive impacts on farm productivity, livelihoods, and biodiversity.** Holistic support provided by the project resulted in a wide spectrum of benefits (Figure B1). These included productivity gains at the farm level, with milk production per hectare increasing by 17 percent; a 35 percent reduction of soil erosion based on samples of monitoring sites; and an average increase in rancher income of \$532 per hectare per year. The program also improved the capacity and participation of women. For example, the share of women involved in Asogranja, a cattle-ranching association, increased from 25 percent at the start of the program to 55 percent by the end (TNC 2023). The project invested in the science-based on-farm monitoring of biodiversity (birds, beetles, and plants) with the help of The Nature Conservancy and Colombian Center for Research on Sustainable Agricultural Production Systems. This monitoring revealed various biodiversity gains, for example, the presence of bird populations increased by 32 percent in areas enrolled in the program.

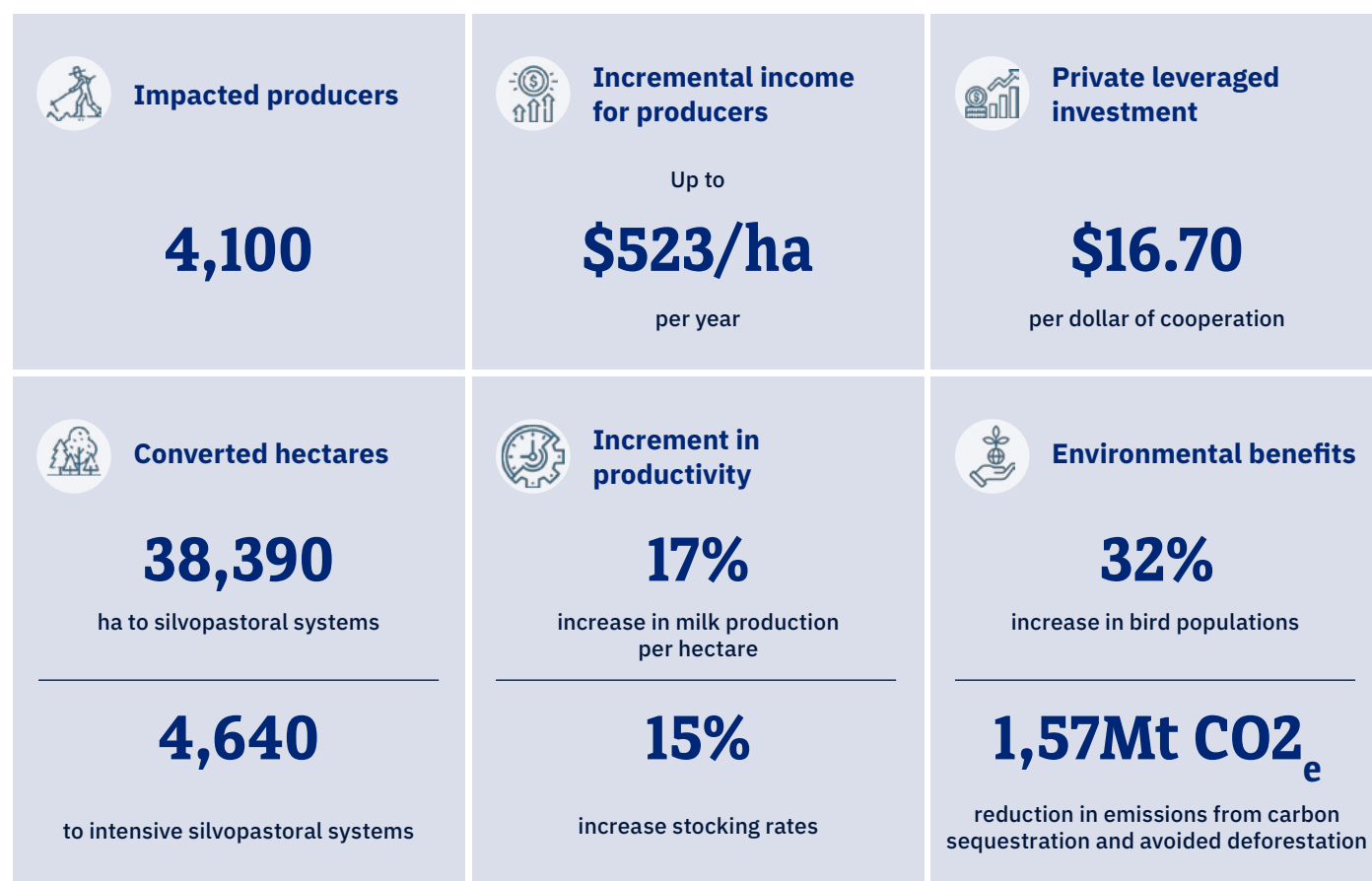


**BOX B1.****Instrument overview: Payments for ecosystem services**

Payments for ecosystem services (PES) supports conservation and restoration actions by landowners or communities based on the twin principles that those who benefit from environmental services (such as users of clean water) should pay for them, and that those who contribute to generating these services (such as upstream land users) should be compensated for providing them (World Bank 2011).

PES is a voluntary, conditional transaction with at least one seller, one buyer, and a well-defined environmental service (CIFOR 2005). The approach is used to incentivize landowners to protect or restore natural ecosystems by compensating landholders for the opportunity and implementation costs associated with activities that enhance ecosystem services (for example, by restoring land use that generates positive environmental externalities) (Rasch et al. 2021).

Latin America has accumulated substantial experience with the use of PES since the first such program was established in Costa Rica in 1997. PES requires a secure long-term source of funding, whether public or private, to work effectively, because in most cases payments to providers need to be made for long periods of time, often indefinitely. The inability or unwillingness of most governments to devote budget to such programs has limited the number of national-scale PES programs (World Bank 2011).

**Figure B1.** Key results of the Mainstreaming Sustainable Cattle Ranching in Colombia project

**Source:** Adapted from World Bank (2019a) and World Bank (2021a). The results presented are not exhaustive; for further information please see World Bank (2020).

## The financial solution

**The PES schemes were financed by international donors and local partners** (Figure 12 on page 23). The project was approved in March 2010 as a \$7 million grant from the Global Environment Facility and later received financing of \$20.5 million from the United Kingdom Government as well as co-financing, technical, and operational support from local philanthropic partners and private partners (valued at \$6.7 million). These project partners included Fondo Acción, The Nature Conservancy, the Colombian Center for Research on Sustainable Agricultural Production Systems, and the Colombian Cattle Ranching Association.

**With the help of the financial incentives created by the PES mechanism, cattle producers contributed nearly \$22 million under the schemes, covering more than half the cost of the transition.** Cattle ranchers contributed 68 percent of the cost of implementing non-intensive silvopastoral systems, and about 50 percent of the cost of intensive silvopastoral systems. Upfront grants to incentivize land-use change and ex-post cash payments after conversion were used to achieve this (Table B1).

**Table B1.** Overview of PES schemes

| PES1 Biodiversity scheme                                                                                                                                                                                                                                                                                                                                                           | PES2 Carbon scheme                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Total payout: \$2.12 million, averaging \$1,430 per contract</li> <li>• A payment-for-results scheme where grant payments are tied to verified land-use change such as dispersed trees in pasture, live fences, and windbreaks (World Bank 2010). Payments were proportion to the expected increase in environmental services.</li> </ul> | <ul style="list-style-type: none"> <li>• Total payout: \$71,584</li> <li>• Scheme provided upfront in-kind support equivalent to \$450 per hectare (up to 10 hectares per beneficiary), plus a single post payment of up to \$150 per hectare after conversion has taken place</li> <li>• PES scheme was designed to cover between 30 percent and 40 percent of the cost of the transition to an intensive silvopastoral system.</li> </ul> |

**Source:** World Bank (2021a).

**The financial solution was calibrated over the project's lifetime to better respond to the ranchers' financing needs.** Several years into the implementation of the PES-1 Biodiversity scheme, the PES-2 Carbon scheme was established to cover a greater share of upfront costs associated with transitioning to intensive silvopastoral systems, where land preparation is more labor-intensive and costly. The initial scheme design provided insufficient incentives for farmers to initiate conversion to an intensive silvopastoral system, or conduct it at scale. To address this, the restructured PES-2 scheme provided more upfront support, in a combination of cash and in-kind support equivalent to \$450 per hectare (instead of \$200, as originally envisaged), up to a maximum of 10 hectares per farmer (instead of five, as originally envisaged).

**At the national level, Law 970 (Ministerio de Ambiente 2017) and the policy on implementing PES schemes, CONPES 3886 (DNP 2017),** were adopted in 2017. This policy was approved as a component of Colombia's peace agreement, within a broad strategy to improve rural development and livelihoods and maintain peace. The policy describes PES schemes as a mechanism for improving agricultural practices by conserving natural resources and promoting peace through more secure rural livelihoods. Many of the lessons learned in this project contributed to CONPES 3886, and project implementers worked closely with policy makers. Furthermore, Colombia's Ministry of Agriculture and Rural Development issued policy guidelines on sustainable cattle ranching for the period 2022 to 2050. The guidelines establish criteria, principles, and indicators to assess sustainable cattle ranching, all of which were informed by the project.

**The PES schemes also paved the way for more private financing.** Project developers hoped that initial financing would leverage more private financing from commercial banks (World Bank 2010). Building on the successful model implemented by the Mainstreaming Sustainable Cattle Ranching in Colombia project, which combined financial solution with technical assistance, financial institutions Bancolombia and Finagro established targeted credit lines for silvopastoral systems with technical assistance.

## Risks

**Several socio-political risks needed to be addressed in the development of this project, especially relating to the criteria for including beneficiaries.** Informality in land ownership is common in Colombia, and has been exacerbated by the internal conflict, which displaced many rural communities (Vanegas-Cubillos et al. 2022). The program sought to work only with those who could prove formal land title and were not affiliated with the conflict. If the program was to expand nationally, it would have the potential to address various pressing restoration challenges, including in regions where deforestation is primarily caused by cattle ranching. However, many of these regions are still plagued by conflict and pose a risk to the successful monitoring and implementation of potential projects.

## Lessons learned and broader relevance

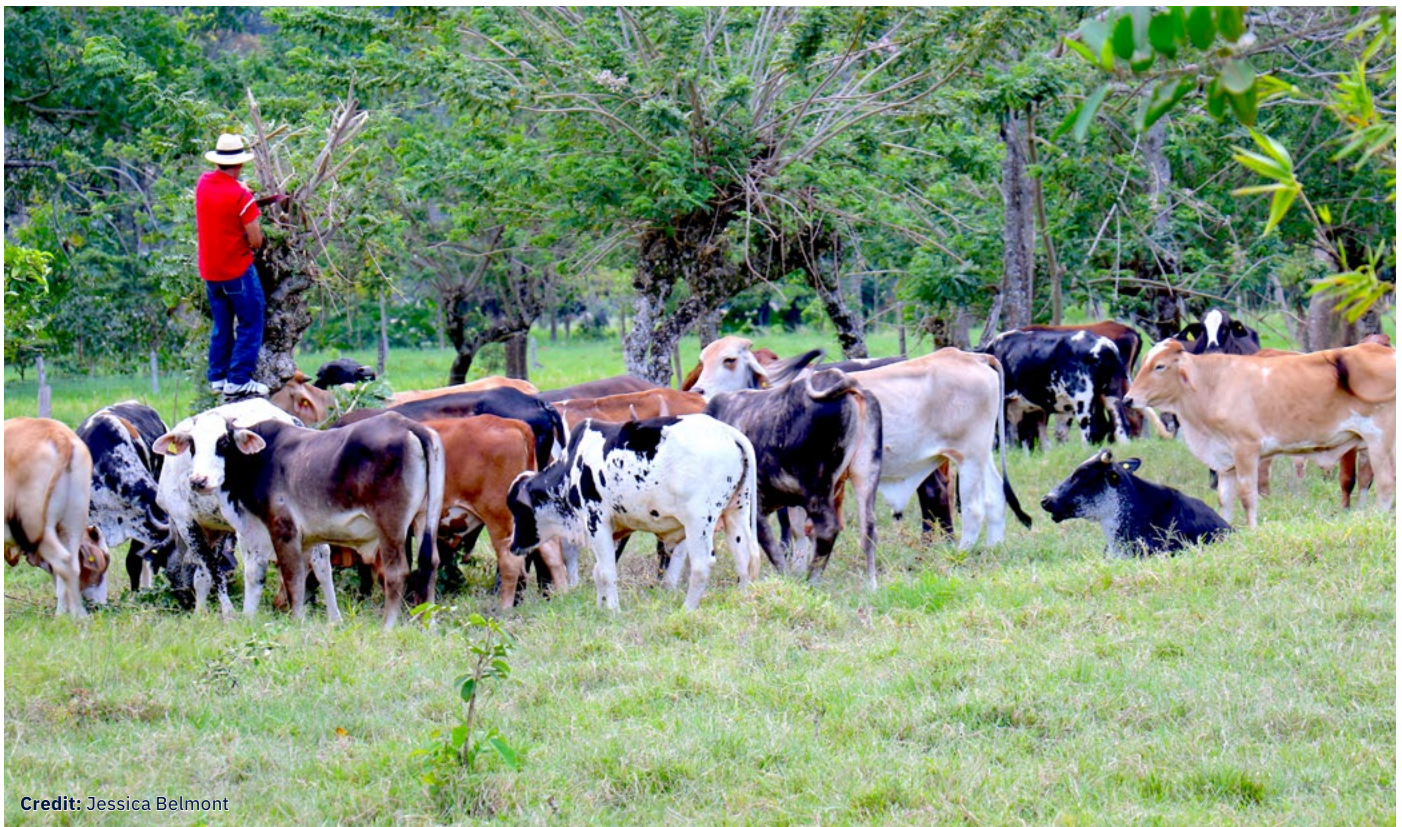
**PES programs that aim to bring about systemic transformation require capacity-building, incentives for innovation, and advisory services to create awareness and narrow knowledge gaps—including those relating to the business case for the silvopastoral model.** A unique characteristic of this PES program was its semi-experimental quality. Learning from other PES schemes has helped the program identify critical levers, including the need to tackle upfront costs, which prevent many small-scale

cattle producers from implementing silvopastoral systems, and the need to demonstrate to farmers the benefits of restoration work, which differ from project to project due to unique ecological, soil, and environmental conditions. Incentives need to be aligned with systems that support knowledge and dissemination.

**Small-scale cattle producers who wanted to make changes but did not have the means to cover the upfront costs of adopting a silvopastoral system showed the greatest interest in the PES program.** The PES program targeting carbon sequestration, which focused only on intensive silvopastoral systems, found that payments made after land conversion did not drive decisions to transition to the silvopastoral model. There was a need to increase ex-ante payments and other types of in-kind support to incentivize the shift.

**The importance of institutional support and collaboration cannot be underestimated.**

A serendipitous yet crucial aspect of this project was the institutional arrangement among project implementers and contributors. This project brought together a range of organizations that included environmentally focused nonprofit organizations; the for-profit Colombian Cattle Ranching Association; and Bancolombia, a private bank. This arrangement led to an experimental and collaborative approach that encouraged recalibrating the solution as implementation progressed. The project was able to meet and exceed many of its goals, and the PES pilots have informed national policy (ONVS 2021).











Credit: Jessica Belmont



C

## AGRI3 Fund

|                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                               |                                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <b>Theme</b><br><br>Sustainable agriculture                                                                       |  <b>Geography</b><br><br>Initial focus on South America (Brazil) and South Asia (India)                                                                                                                         |  <b>Sources of finance</b><br><br>Concessional public funding and private funding                            |  <b>Instruments</b><br><br>Blended finance fund providing risk mitigation products (partial guarantees) and liquidity instruments (such as subordinated loans) to commercial banks |
|  <b>Investment drivers</b><br><br>Voluntary insetting and market access (producers); financial returns (investors) |  <b>Investment size</b><br><br>AGRI3 Fund size: \$100 million. Typical contribution by the fund is in the range of \$3 million and \$15 million to enable commercial loans between \$5 million and \$50 million |  <b>Financial returns</b><br><br>Below-market to market rate depending on the investment tranche (investors) |  <b>Time horizon</b><br><br>10-year loans, on average                                                                                                                              |

### Context

**Healthy, biodiverse ecosystems provide fertile soils, pollination, and water regulation among many other ecosystem services that make food production possible—but these services are threatened.** In many countries, the agricultural frontier continues to expand at the expense of critical natural ecosystems. Current patterns of agricultural intensification are eroding soils, diminishing fertility, and jeopardizing water resources in many landscapes. Thirty-four percent (or 1.66 billion hectares) of the world's agricultural land is already degraded (FAO 2021). In the Brazilian Amazon alone, 24 million hectares of pastures are moderately or severely degraded and in need of restoration (Barlow et al. 2023). With global food demand expected to increase by up to 60 percent between 2010 and 2050 (Van Dijk et al. 2021), the world's critical ecosystems and their ability to feed a growing population hang in the balance.

**A shift to sustainable and regenerative farming practices is needed to restore land that is already degraded and to ensure that future increases in production do not lead to widespread loss of ecosystem services.** However, recovering forest cover where it has been illegally cleared and transitioning to regenerative practices such as reduced tillage, crop rotation, agroforestry or silvopasture can be costly and labor-intensive.

**Lack of access to finance is one of the main barriers to the expansion of regenerative agriculture.** Traditional lenders view the transition to sustainable farming practices as riskier because the concept requires a longer time horizon to produce results. Many commercial bank loans to agricultural producers have a payback period of between one and three years. However, returns on investments in agroforestry or silvopasture tend to have longer time horizons. Lenders are also exposed to completion risks on top of the usual weather and price risks. As a result, many countries lack domestic commercial finance focused on promoting sustainability in agriculture.

## Project description

**The AGRI3 Fund aims to unlock \$1 billion of financing for the transition to more sustainable practices in agricultural value chains and improved rural livelihoods in developing countries.** Initiated in 2017, [AGRI3 Fund](#) is a partnership between Rabobank and the United Nations Environment Programme with the support of the Sustainable Trade Initiative (IDH) and the Dutch Entrepreneurial Development Bank. The fund unlocks financing for sustainable agriculture by providing credit enhancement tools (mainly partial loan guarantees) to commercial banks to facilitate the financing of sustainable agricultural projects that would otherwise be considered too risky. A technical assistance facility has also been established to support projects before and after investment in order to maximize their impact and mitigate environmental and social risks.

**Investments supported by the fund contribute to innovation and the scaling up of best practices that lower agriculture's footprint,** including by actively preventing deforestation, stimulating reforestation and restoration of degraded agricultural land, and reducing carbon emissions. Fund-level key performance indicators are centered around the protection of existing natural forests and restoration of natural and modified ecosystems; sustainable agriculture; and improving rural livelihoods. Eligible activities include restoring ecological corridors; ecological intensification and diversification; and restoring soil health.

**The fund focuses on low- and middle-income countries,** notably Brazil and India, with plans to expand financing to other countries in Latin America, Southeast Asia, and Sub-Saharan Africa. A focus on key agricultural commodity exporters such as Brazil helps improve access to finance where continued technological development and sustainable productivity gains are critical, and where domestic commercial banks and producers have the capacity to taken on such loans.



## The financial solution

**AGRI3 provides blended finance that unlocks commercial banks' lending for sustainable agriculture.** AGRI3 is composed of a finance fund (managed by investment advisors FOUNT and Cardano Development), and a complementary technical assistance facility managed by IDH. The blended finance fund pools concessional and commercial financing from donors and investors, including Rabobank, the Dutch Ministry of Foreign Affairs, and equity investors (see Figure 13 on page XX). The fund has a layered financing structure with three tranches:

### → First loss tranche:

A \$40 million non-interest-bearing repayable loan from the Dutch Ministry of Foreign Affairs (the most junior tranche).

### → Second tranche:

A \$13.5 million non-interest-bearing repayable loan from the Global Environment Facility, in partnership with Conservation International (Conservation International 2023).

### → Debt tranche:

A \$50 million debt facility from Rabobank to match first loss capital and equity investments (the most senior tranche).

**The first loss tranche allows AGRI3 to attract private non-concessional funding and increase the capitalization of the finance fund.** AGRI3, in turn, offers risk mitigation products (such as partial risk guarantees) to its partner banks—commercial domestic banks that are operating in the targeted countries targeted and are lending to farmers. The fund typically covers between 40 percent and 50 percent of the exposure on a loan provided by the commercial bank. The typical contribution by the fund is in the range of \$3 million to \$15 million to enable commercial loans between \$5 million and \$50 million, with a typical loan size of between \$5 million and \$10 million. Other instruments used include pari-passu and tenor extension guarantees, which also reduce the risk or improve liquidity of the commercial bank's lending to agricultural producers pursuing sustainable practices.

**The fund already supports about \$70 million of loans issued by partner banks and another \$50 million to \$60 million is currently in the fund's pipeline.** Funding provided so far is expected to help protect 10,000 hectares of natural ecosystems directly, and 67,000 hectares indirectly; to restore 1,500 hectares of natural ecosystems and rehabilitate 14,000 hectares of degraded pasture and agricultural land; and to increase cattle yield by 88 percent on farms engaging in sustainable intensification. Box C1 outlines an investment example in Brazil. The complementary technical assistance facility supports the finance fund's strategy development and helps strengthen the impacts of investments on the ground.

**BOX C1.****Enabling pasture restoration and forest protection in****Brazil**

About 50 percent of Brazilian pastures suffer from degradation (MapBiomass 2022), which typically translates into reduced yields. Since the Brazilian Forest Code limits conversion of forests to agricultural land use and nearly 50 percent of Brazil's land, or 423 million hectares, is protected

and preserved (Embrapa 2022), farmers are seeking ways to grow their production sustainably. This complements government low-interest financing programs for low-carbon agriculture, such as Brazil's National Program for Low-Carbon Emissions in Agriculture (Programa para Redução da Emissão de Gases de Efeito Estufa na Agricultura—ABC+ Program).

Responding to this demand, in 2022 AGRI3 had a guaranteed exposure of \$14.1 million in Brazil, of which \$6.5 million has supported pastureland renovation, \$5.2 million

has supported sustainable sugar, and \$2.4 million has been invested in cattle intensification. One investment that AGRI3 has supported is a \$5 million, 10-year loan to the Carvalho Dias Group, a large cattle farm in Mato Grosso, Brazil. The AGRI3 fund has de-risked the loan through a partial guarantee covering up to \$2 million. This loan will help the producer protect or reforest more than 2,500 hectares and recover 1,200 hectares of degraded pasture, contributing to increasing the yields without clearing forests.

**Risks**

**The success and time horizon of restoration and community-development initiatives vary, which translates into risks of non-compliance with the project-level risk mitigation measures and the key performance indicators set by the AGRI3 fund in relation to the domestic lenders.** The AGRI3 fund requires borrowers to comply with environmental and social performance standards and the associated environmental and social action plans they develop to mitigate any negative impacts the investment may have on natural or critical habitats. In addition, the fund has put in place advanced monitoring and reporting against key performance indicators. Environmental impact is monitored throughout the lifecycle of the project, starting with a feasibility assessment and continuing through subsequent evaluation against key performance indicators upon delivery of relevant activities.

**Lessons learned and broader relevance**

**The rationale for financing sustainable and restorative agriculture is growing for all actors involved. However, early-stage risk finance remains catalytic for private investment.** From the farmers' (particularly large agricultural producers') perspective, innovation is paramount for remaining competitive, and access to sustainable finance helps them transition to nature-positive practices faster. Commercial banks are starting to see reasons to diversify their portfolios to include regenerative agriculture, but face the scrutiny of the credit process, which is not typically designed for such investments. Donors, in turn, are looking to support sustainable agriculture through models that do not rely solely on donor finance. However, they lack engagement with the private sector.

The AGRI3 fund bridges the gap between these actors and accommodates different levels of risk to unlock private finance.

**The potential for scalability and replication of this approach is high.** The model blends concessional finance with private finance that seeks commercial returns, so diversifying financing sources and increasing the capitalization of the fund. This, in turn, enables it to unlock further domestic lending. The AGRI3 fund is seeking a credit rating, which would enable it to reach more commercial lenders in emerging markets that face similar constraints (namely higher perceived risk and longer payback periods) when considering financing sustainable commodities—whether these be timber, rubber, or other commodities. The AGRI3 model is thus relevant to many emerging markets.

**Factors that could help replicate and scale such blended approaches are greater standardization of loan products and stronger policy signals.** The development of tailored, standardized loan products can reduce transaction costs for commercial banks. The “Renova Pasto” program—which is delivered through a partnership between Rabobank, AGRI3 Fund, and IDH—will provide long-term financing of up to 10 years to Brazilian cattle farmers in the Cerrado and Amazon regions for activities that sustainably reestablish degraded pastureland and accelerate compliance with the Forest Code, so improving the conservation and restoration of forest areas on cattle farms (AGRI3 Fund 2023). The standardized package of long-term loans (and accompanying technical assistance) are supported by partial guarantees from AGRI3, which enables the bank to extend financing for up to 10 years and support non-cash generating activities such as forest conservation. Rabobank also engages with other commercial banks to improve origination by streamlining and standardizing their criteria for eligible sustainable cattle ranching projects. Ultimately, strong policy incentives for sustainable, deforestation-free agricultural value chains are needed to bring scale to restoration.



Credit: Rabobank Rural Brazil

## D

## Bosques Amazónicos

|                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <b>Theme</b><br><br>Sustainable forestry; carbon markets                         |  <b>Geography</b><br><br>Ucayali and Madre de Dios region, Peru                                                                                                                                                                                                           |  <b>Sources of finance</b><br><br>Private and public capital markets, voluntary carbon market                                                                                                                             |  <b>Financial returns</b><br><br>Market returns                                                                                                                                                                                                                                                                                                                                             |
|  <b>Time horizon</b><br><br>Timber (native) and carbon crediting period 20+ years |  <b>Investment size</b> <ul style="list-style-type: none"> <li>• Equity \$50.4 million as of March 2023</li> <li>• Short-term program (outstanding): \$9.3 million as of March 2023</li> <li>• Long-term program (outstanding): \$7.2 million as of March 2023</li> </ul> |  <b>Investment drivers</b> <ul style="list-style-type: none"> <li>• Business opportunity (project developer)</li> <li>• Voluntary offsetting (buyers of carbon credits)</li> <li>• Diversification (investors)</li> </ul> |  <b>Instruments</b> <ul style="list-style-type: none"> <li>• Commercial papers (maturity 1 year, aggregating up to \$20 million) issued on the Lima Stock Exchange</li> <li>• Corporate green bonds (5 years, aggregating up to \$45 million) issued on the Lima Stock Exchange</li> <li>• More than 16 million carbon credits sold in the international voluntary carbon market</li> </ul> |

## Context

**The Amazon rainforest covers nearly 60 percent of Peru's territory and supports some of the most vulnerable communities.** Peru is home to the second-largest area of the Amazon rainforest after Brazil, making it one of the 10 most biodiverse countries in the world. About 90 percent of this forest is classified as primary. This forest is an asset for Peru, supplying raw materials for both wood- and non-wood-based industries. It is also home to more than 50 indigenous peoples (GOB.PE 2023), including some of the most vulnerable rural populations that depend heavily on the forest for their livelihoods, food, and shelter. In the province Ucayali, forest-derived income accounts for nearly 40 percent of the total income of local households, on average (Porro et al. 2015).

**Deforestation and forest degradation are depleting the natural capital endowment.**

The Peruvian Amazon has faced high deforestation rates in recent decades. Between 2001 and 2015, 1.8 million hectares of forest were lost (Finer and Novoa 2017, GeoBosques 2022), mostly due to land-use pressure from agriculture. Some of the converted land is abandoned due to declining productivity. Previously forested tropical soils can be nutrient-poor and prone to further loss of nutrients if converted to agricultural use (Lesack and Melack 1996). Timber resources are also used unsustainably: between 37 percent and 90 percent of timber trade is illegal, damaging the ecosystem, depressing

national markets by lowering prices, and making legal and sustainable logging less economically viable (ISEAL Alliance 2018). The forest sector currently contributes less than 1 percent of Peru's GDP (CNF 2022).

**In the Ucayali province, deforestation and illegal logging have decimated parts of the rainforest, resulting in abandoned land and foregone economic opportunities.** Between 1999 and 2005, 64 percent of all deforestation and degradation in the Peruvian Amazon occurred in Ucayali (Piu and Menton 2014). Parts of the province have seen a vicious cycle of unsustainable logging and subsequent conversion to arable land. Without the natural forest cover, the soil degrades quickly and the land is either converted to pastureland or abandoned (BAM 2011). Lost ecosystem services impact food security and livelihoods because local farmers can no longer grow staple crops (Blundo-Canto et al. 2020). In this province, nearly 80 percent of timber is also extracted illegally (World Bank 2017).

**Peru has pledged to restore 3.2 million hectares of degraded forests, including in the Ucayali province, but the efficacy of such initiatives varies and financing remains a constraint** (Initiative 20x20 2023). Restoration through natural regeneration (Chazdon 2008), agroforestry (Robiglio and Reyes 2016), and reduced impact logging of tree plantations (Medina et al. 2009) have shown positive results on some degraded lands in Ucayali (Karsten et al. 2014). However, the efficacy of these strategies varies.

**The forestry sector in Peru is underdeveloped despite having a competitive advantage relative to other countries in the region.** There is a financing barrier in traditional banking, especially on the protracted time horizons that projects of this type require. Furthermore, there is a lack of government presence in Ucayali and Madre de Dios that contributes to a lack of financing for forestry and restoration.

## Project description

**Bosques Amazónicos S.A. (BAM) is a private company established in 2004 with a mission to protect and restore the value of the ecosystems of the Amazon.**

BAM privately owns an area of more than 24,500 hectares, making it the largest private landholder in the Peruvian Amazon. The company's business model is built on two core activities: forest conservation and the restoration of degraded agricultural land through commercial forest plantations that reforest the land with native species. Both are revenue-generating activities. BAM sells timber from its commercial forest plantations and generates carbon credits from forest restoration and conservation. BAM also sells some of its nursery seedlings, grown to support its restoration activities. The company operates in Madre de Dios and Ucayali (Box D1).



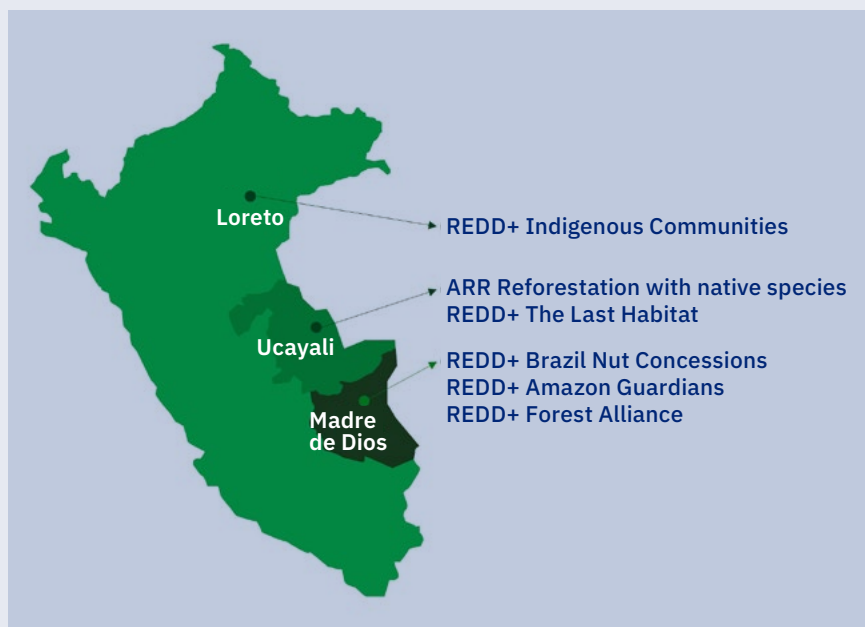
**BOX D1.****Bosques Amazónicos' projects in Ucayali and Madre de Dios**

**Bosques Amazónicos' (BAM's) project in Campo Verde, Ucayali, is restoring 18,000 hectares of degraded forest and pasture lands purchased by BAM in 2008.** To date, BAM has reforested 1,200 hectares of degraded pasture with more than 1 million high-value native species. The project generates revenue by selling sustainably harvested timber and carbon credits from afforestation, reforestation, and revegetation. In 2010, the reforestation program became the first in the world to be certified under the Verified Carbon Standard.

The Campo Verde project is supported by a nursery with a production capacity of 1 million trees per year (BAM 2011). By taking advantage of the genetic capital acquired, and with a view to increase the value of the forest and the productivity of its plantations (by up to 30 percent), BAM is developing a forest genetic improvement program in collaboration with the Instituto Tecnológico de Costa Rica. BAM is also implementing a series of forest conservation-focused projects:

✓ **REDD+ Brazil Nut Concessions project.**

This project has been protecting unique Brazil nut forests in cooperation with Brazil-nut-growing families (concessionaires and small land holders) since 2009. The project currently protects more than 500,000 hectares, avoiding more than 2.5 million tons of CO<sub>2</sub>e (tCO<sub>2</sub>e) per year in emissions and directly impacting more than 650 rural families.



✓ **REDD+ Amazon Guardians.**

This REDD+ project focuses on areas in the Madre de Dios region that have been severely affected by deforestation due to illegal mining. The project works with regional concessionaires in the Tambopata buffer zone to protect more than 79,000 hectares of highly threatened forests, avoiding 504,124 tCO<sub>2</sub>e of emissions on average per year.

✓ **REDD+ Indigenous Communities.**

BAM has signed a cooperation agreement with the Chamber of Commerce of Indigenous Communities of Peru for the creation of forest carbon projects in their territories - being the first cooperation agreement between the private sector and indigenous organizations in the Peruvian Amazon. Initially, BAM is developing a REDD+ project in Loreto, with the participation of 39 indigenous communities covering a territory of more than 300,000 hectares.

✓ **REDD+ The Last Habitat.**

This project protects 20,000 hectares of private land in Ucayali. Located 45 minutes from the city and surrounded by deforestation pressures from agriculture, urbanization, and other stressors, the project area is the last refuge for several species of flora and fauna. This conservation project avoids 700,000 tCO<sub>2</sub>e of emissions on average per year, contributing to rural development.

✓ **REDD+ Forest Alliance.**

BAM is working in association with 16 medium- to large-scale ecotourism and conservation concession holders in Madre de Dios for the protection of more than 220,000 hectares of highly biodiverse forest.

BAM is also designing and developing new reducing emissions from deforestation and forest degradation (REDD+) projects to be included in its portfolio in the short term.



**Sustainability is at the core of BAM's business model. This, coupled with certifications and the use of a carbon crediting standard, has given BAM broad market access.<sup>10</sup>**

Restoration projects set aside 40 percent of the project area for natural regeneration, while 60 percent is used for the commercial plantation with native species (BAM 2021). The timber produced on BAM's plantations is Forest Stewardship Council-certified. Carbon credits are validated under the Verified Carbon Standard, which is the most widely used carbon accounting standard in the voluntary market. BAM's project in Campo Verde has also been awarded gold-level certification by The Climate, Community & Biodiversity Alliance. The sustainable timber is in high demand on Peru's domestic market, while the carbon credits have been sold to international buyers such as LATAM Airlines, Natura, and Qantas Airways, which sought to offset their carbon footprints.

**Over the 19 years of its existence, BAM has protected over 1,000,000 hectares of native forests and restored 1,200 hectares by planting more than 1 million native trees.**

By 2030, BAM plans to reforest approximately 10,000 hectares with native species such as shihuahuaco, marupa, cumaru, and tahuari (BAM 2011). Related restoration activities have also benefited numerous families in the Ucayali region.

**BAM directly creates about 200 jobs each year, mainly for workers from communities surrounding the property in Ucayali, to fulfill its responsibilities.** In Madre de Dios, more than 700 families benefit directly from the REDD+ conservation projects. BAM is associated with forest concession families for the development of its REDD+ projects. The Peruvian state grants concessions to small producers for a 40-year renewable period. In accordance with forestry law, the concession holders are granted the rights to ecosystem services.

## The financial solution

**BAM became the first forestry company to be listed on the Lima Stock Exchange (Bolsa de Valores de Lima), which has helped the company access finance at more competitive rates than those offered by domestic banks.** To finance its working capital and initial investments in reforestation, BAM has offered two instruments through the Lima Stock Exchange (PCR 2022):

- **The Commercial Paper Program of Bosques Amazónicos** saw seven rounds of commercial papers being issued with maturity of one year. This short-term instrument, locally rated PE1 by the Pacific Credit Rating agency, allowed BAM to raise more than \$20 million to finance the working capital of its business units.

<sup>10</sup> BAM follows a carefully designed scientific method when restoring degraded lands, beginning with an assessment of the level of degradation through soil tests and preparation of the soil prior to planting to ensure that seedlings will thrive. BAM is also involved with the identification and selection of genetically superior varieties of tree species.

- **The Green Corporate Bonds program of Bosques Amazónicos** (Box D2) issued US dollar-denominated bonds aggregating up to \$45 million, with five-year maturity. The Pacific Credit Rating agency rated the longer-term instrument PEA+. BAM used the bonds to finance forest plantations and acquire capital goods.

The Green Corporate Bond Program has raised \$7.1 million to date via two placements, offering a yield of 9.7 percent. By offering a competitive interest rate to investors via capital markets, BAM has raised capital at a lower cost than the cost of debt typically offered by domestic banks, and with longer maturity. These have been the driving factors behind BAM's decision to turn to capital markets to finance its operations. Investors have found the interest rate attractive and more competitive than the cost of debt typically offered by domestic banks, while also providing longer tenures and better rates.

#### BOX D2

### Bosques Amazónicos' Green Corporate Bond

In 2021, Bosques Amazónicos (BAM) priced its green bond against Climate Bonds Forestry criteria, the first of its kind in the region and the first certified deal in the country.<sup>11</sup> The Pacific Credit Rating agency reviewed the five-year, \$45 million deal against the Climate Bonds Standard 3.0 (BAM 2020). The proceeds will go to protecting nearly 11,000 hectares of forests and restoring nearly 2,970 hectares of land in the region of Ucayali, avoiding a total of 10 million tons of CO<sub>2</sub> emissions and protecting the local natural flora and fauna (Vazquez et al 2022). Two further placements followed: \$4.3 million in December 2021 and \$2.7 million in March 2022, totaling \$7 million (PCR 2023).

**Table D1.** The main assets financed by the bond (\$ million)

| Asset                                     | 2021 | 2022* | Total |
|-------------------------------------------|------|-------|-------|
| <b>Restoration/reforestation</b>          | 0.87 | 0.98  | 1.84  |
| <b>Nursery</b>                            | 0.63 | 0.22  | 0.85  |
| <b>Restoration/reforestation services</b> | 0.15 | 0.53  | 0.68  |
| <b>Conservation</b>                       | 1.34 | 2.41  | 3.75  |
| <b>Total</b>                              | 2.98 | 4.14  | 7.12  |

\* Projected at the end of December

**Source:** Pacific Corporate Sustainability (2023).

<sup>11</sup> Although Bosques Amazónicos was not the first forestry sector company to reach the local green bond market it was the first to fund the forestry sector in the country. It was also the first green Climate Bonds Certified forestry deal in the Latin American and the Caribbean region.

**BAM expects to repay these obligations with revenue from the sale of carbon credits, certified timber, and nursery seedlings** (see Figure 14 on page 25). BAM invests about \$8,000 per hectare in its reforestation business (Rodriguez and Sabogal 2019). For avoided deforestation through REDD+, current investments are about \$2 million per year. In 2021, BAM recorded a new record of sale of approximately 4 million carbon credits with a turnover of \$17.2 million (BAM 2022). With more than 10 years of experience in the carbon market, BAM has a portfolio of clients that includes companies such as LATAM Airlines, SURA Peru, Natura Cosméticos, and leading brokers in the market such as Hartree Partners, Anew, and Climate Partner.

### BOX D3

#### Instrument overview: Green bonds and commercial papers

|                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                               |                                                                                                                                                                                               |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>✓ <b>Green corporate bonds</b> are financial instruments issued by a company to finance its green projects and provide investors with regular or fixed income payments over a defined timeframe. Bonds are a type of debt security, and those issued as “green bonds” are formally defined as “any type of bond</p> | <p>instrument where the proceeds or an equivalent amount will be exclusively applied to finance or re-finance, in part or in full, new and/or existing eligible green projects which are aligned with the four core components of the Green Bond Principles” (ICMA 2022).</p> | <p>✓ <b>Commercial papers</b> are a short-term, unsecured debt obligation that is issued by financial institutions and large corporations to cover expenses in the short term (CFI 2023).</p> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Risks

**BAM faces a range of risks associated with carbon credits, which underpin its business model.** For a business heavily reliant on carbon credits, the price volatility of global carbon markets as well as Peruvian legislation regulating the carbon market and carbon payment arrangements are a source of risk. So are the credibility and transparency of the carbon markets, as demonstrated by recent research that questioned some of the methodologies used by global carbon registries to estimate the effectiveness and additionality of interventions supporting avoided deforestation, including on BAM's sites (SourceMaterial et al. 2023).

**Other risks relate to the success of restoration and conservation, and securing the expected outcomes on the ground.** BAM notes challenges with the day-to-day implementation of restoration actions due to lack of government presence in many areas

where the company operates and illegal land use in several areas of the Peruvian Amazon, which pose security risks to those engaged in restoration on the ground. In conservation-focused interventions, such as those in the Madre de Dios sites, effective and continued engagement with communities and local producer federations is a prerequisite of success (SourceMaterial et al. 2023), given that their decisions affect whether the project realizes the anticipated avoided deforestation. There is a particular risk of “leakage”, or displacement, of deforestation or forest degradation (and associated emissions) outside the project area, which weakens the additionality of the project.

## Lessons learned and broader relevance








**BAM has demonstrated that forest restoration and conservation can be financed by capital markets, and that it can be both commercially viable and deliver positive environmental outcomes.** The model is already being replicated to support restoration in other countries in Latin America such as Brazil, Guatemala, and Panama.

**Since the company’s business model depends on effective engagement of communities and local producers, collaboration with local government is also key to mitigate some of the business risks.** At sites seeking to incentivize reduction in deforestation, some factors lie outside of the company’s control. For example, deforestation can be highly sensitive to broader market dynamics, such as change in land values and rents, or because of increased pressure on forests in reaction to a change in commodity prices. Broader enabling conditions implemented by federal or local government—such as enforcement of anti-deforestation laws, strong local governance, and institutional collaboration—are key to the success of an individual REDD+ project.

**Further development of voluntary carbon markets to enhance their transparency and integrity is needed to facilitate scaling and replication of business models such as BAM.** Today’s voluntary carbon markets are fragmented and complex. Project developers can face scrutiny over claimed emissions reductions and many market participants still find it difficult to navigate various standards in different jurisdictions and to find high-quality carbon credits at transparent prices. For a new market participant, it may be difficult to understand what constitutes a high-quality credit, especially since the views on additionality, permanence, and leakage evolve in step with advances in science, technology, and market views on appropriate crediting baselines (TSVCM 2021). Harmonization of international carbon credit standards, which The World Bank supports, is needed to remove barriers to scaling up and replication of other similar businesses.

## E

## Resource Environmental Solutions

|                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <b>Theme</b><br><br>Wetlands, streams, and protected species habitat; mitigation banks                                              |  <b>Geography</b><br><br>United States                                                                                                                              |  <b>Revenue model</b><br><br>Sale of wetland and stream, water quality, and other credits in mandatory mitigation markets; delivery of client-specific environmental compensation projects; delivery of ecosystem restoration projects for community resilience              |  <b>Sources of finance</b><br><br>Private equity companies, asset managers |
|  <b>Investment drivers</b><br><br>New revenue/business opportunities (Resource Environment Solutions); financial returns (investors) |  <b>Investment size</b><br><br>Credit project size varies from \$1 million to \$15 million<br>Client-specific projects can reach budgets greater than \$100 million |  <b>Financial returns</b><br><br>Market returns <ul style="list-style-type: none"> <li>• Credit projects offer nominal internal rates of return of between 15 percent and 25 percent</li> <li>• Project developer: on par with traditional private equity returns</li> </ul> |  <b>Instruments</b><br><br>Equity, line of credit                          |
|                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                               |  <b>Time horizon</b><br><br>Credit projects: typically 7–15 years          |

## Context

**In the United States, more than 50 percent of pre-industrial-era wetlands have been lost (EPA 2001), prompting federal regulation to conserve them.** Now recognized as vital ecosystems for water purification, groundwater recharge, and carbon storage, wetlands were long seen as unproductive areas that needed draining to grow crops or harvest peat for fuel and fertilizer (Fluet-Chouinard et al. 2023). The United States Congress passed the Clean Water Act in 1972 to protect water quality, rivers, and wetlands. Under this law any entity, public or private, must obtain a permit if their planned activity is expected to negatively impact jurisdictional wetlands. The [Clean Water Act and related regulations](#) require such a project developer (or “permittee”) to offset unavoidable adverse impacts on wetlands that remain after all appropriate, practicable avoidance and minimization mechanisms have been achieved in line with the mitigation hierarchy (for further details, see [IFC Performance Standard 6](#)). The construction of dams, channelization of streams, filling of wetlands, and similar public works are examples of projects that are often subject to compensatory mitigation. Similar obligations also exist under the 1973 Endangered Species Act for protected species habitat and under equivalent state laws.

**This policy framework has created a vibrant market for restoration in the United States: in 2019, the wetland and stream compensation industry generated direct revenues in excess of \$3.5 billion and a total economic impact of \$9.6 billion (BenDor et al. 2023).** To comply with the law, permittees can create their own offset projects or buy pre-approved units of wetland compensation (also called wetland mitigation credits) from a wetland mitigation bank. Buying wetland mitigation credits is usually regarded by the permittee as simpler and less risky than attempting their own compensation project. As an added bonus, the legal liability for offsetting the environmental impact is shifted from the permittees to the mitigation bank. This creates demand for mitigation banks, which are established by mitigation firms with inputs from a wide network of supporting businesses, including nurseries, engineers, and other service providers. As with all restoration-based businesses and projects, mitigation banks require upfront investments and therefore financing.

## Project description

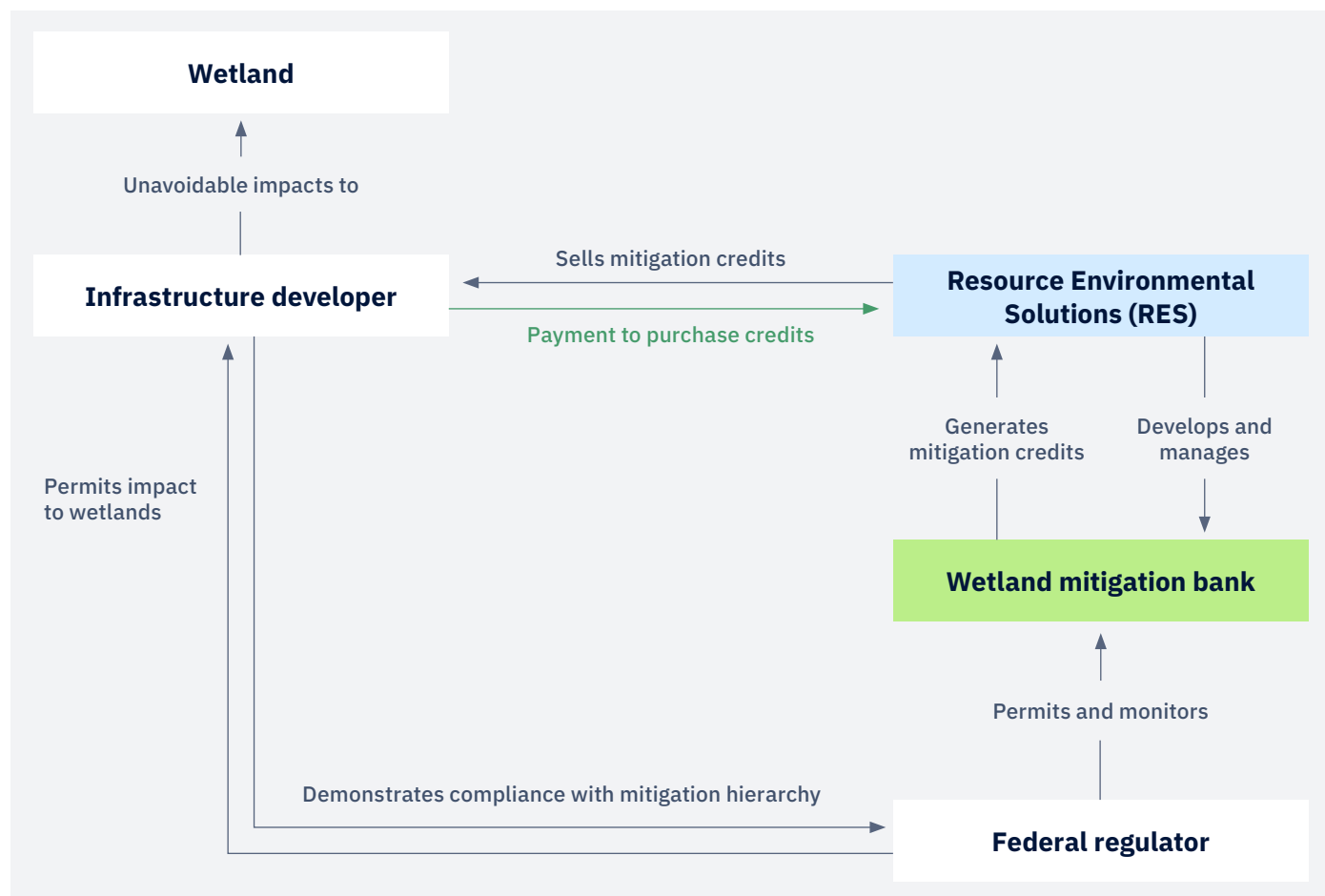
**Resource Environmental Solutions (RES) is the largest wetland compensation project developer in the United States.** This private company was created in 2007 and is currently owned by private equity groups Onex and KKR & Co. It owns or operates more than 130 wetland and stream mitigation banks, as well as biodiversity/habitat conservation banks and water quality projects. These mitigation banks span more than 16,500 hectares across 16 states. RES also develops on-demand projects for companies and governments to support their compliance with environmental regulations or help them meet corporate social responsibility or community resilience goals.

**RES sponsors or develops mitigation banks with the objective of generating and selling mitigation credits to public and private entities required to offset their impact** (see Figure 15 on page 28). To do so, it first obtains approval from relevant federal and state agencies to develop a wetland or stream bank and generate mitigation credits in advance of the impacts. Once this approval is secured, RES is required to place a permanent conservation easement (Box E1) and establish a perpetual endowment fund<sup>12</sup> to ensure that the bank is managed for nature in perpetuity. RES then actively carries out the restoration activities and monitors the restoration for up to 15 years. Public agencies also monitor the site and release credits for sale<sup>13</sup> when ecological milestones are met. Once all the milestones are met and the site is considered self-sustaining, long-term management is transferred to a land trust or other nonprofit specializing in managing and protecting land.

12 These endowment funds are managed by a third-party entity with an expertise in managing properties and funds for conservation in perpetuity. Because of the perpetual nature of these endowments, only interest proceeds can be used to maintain the property and the fund corpus needs to be high, up to several millions of dollars for a single property.

13 Credit activity for each mitigation bank, such as credit releases or credit sales, are publicly available on a [government-run website](#) (RIBITS 2023).



**Figure E1.** Structure of compensatory mitigation banks developed by RES

**In addition to mitigation banking, RES provides tailored, on-demand restoration solutions for large infrastructure or landscape-scale projects, such as the [Klamath river dam removal and river restoration project](#) or the [Bois d'Arc Lake Restoration project](#) (Box E2 and Box E3).**

**BOX E1****Instrument overview: Conservation easements**

A conservation easement is a voluntary legal agreement between a landowner and a government agency or qualified conservation organization that restricts the type and amount of development that may take place on that property

in the future. Conservation easements aim to protect habitat for birds, fish, and other wildlife by limiting residential, industrial, or commercial development. Contracts may prohibit altering the natural topography,

converting native grassland to cropland, draining wetland, or establishing game farms. In the United States, eased land remains in private ownership.

## Financial solution

**RES has secured a series of private equity investments to finance the upfront costs of establishing mitigation banks and company acquisitions to fuel its growth.** Since the mitigation banks it develops require an upfront investment of between \$1 million and \$15 million before mitigation credits can be generated and placed on the market (after a minimum of two to five years), secure financing is required to cover these upfront costs. Early-stage risk capital was provided by angel investors (including the company's founder) when the company was created in 2007. In 2013, Resource Land Holdings, a specialized real asset fund, made an equity investment in the holding company to help scale it. RES has also partnered with landowners and other capital providers interested in investing in mitigation banks. In 2022, RES was acquired by two global private equity fund managers, [Onex](#) and [KKR & Co](#), which will help further scale the business model. See also (Figure 15 on page 28).

**For on-demand restoration projects, RES typically receives fees based on achieving outcomes such as meeting specific project milestones and ecological goals (Edinger and Madsen 2023) rather than the level of effort.** RES uses its balance sheet for bridge financing until the client payment.

### BOX E2

#### Project example: Bois D'Arc lake mitigation project

The \$1.8 billion Bois d'Arc lake is a drinking water reservoir servicing more than 2 million people in Northern Texas. Built between 2018 and 2022, the 16,600-acre (6,700 hectare) reservoir is owned by the North Texas Municipal Water District, a public utility, and will provide up to 70 million gallons of water (or 100 Olympic-sized swimming pools) a day. Under federal regulations, the water district was required to avoid, minimize, and

reduce the project's impacts on nature as well as compensate for any residual impact. In the case of Bois d'Arc lake, the legal requirement to compensate or offset impact extended beyond wetland and streams to include forests and biodiversity.

The Resource Environmental Solutions ecological mitigation project restored and enhanced nearly 6,900 hectares of wetland, grassland, and woodland; planted 6.3 million trees; and restored more than 110 kilometers of river. The ecological construction part of the restoration was completed in late 2022, with monitoring and

adaptive management expected to continue for 20 years.

The environmental outcomes of the project are protected in perpetuity through a deed restriction and a commitment from the utility's Board of Directors for ongoing monitoring and maintenance. Once the project meets its permit requirements, the utility will transfer it to a state or federal government entity for perpetual care of the restored natural resources. The total cost of the environmental compensation is estimated at more than \$100 million (Long and Stahman 2021).

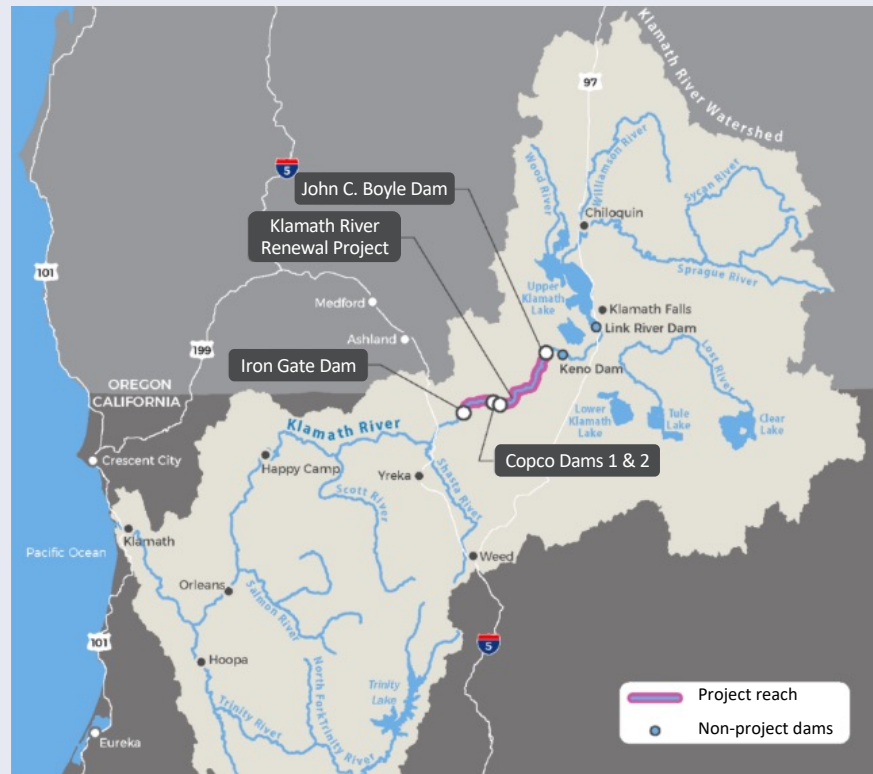
## BOX E3

### Project example: Klamath river dam removal

The Klamath river is an iconic river in the United States, draining more than three million hectares of land. It is also home to distinct populations of salmon (notably Chinook and coho), which are important for the culture and livelihoods of local indigenous people such as the Shasta, Yurok, Karuk, and Hoopa tribes. The river had been dammed four times since 1918 to provide hydroelectric power to towns and industries, with major impacts on indigenous people and biodiversity.

The United States Federal Energy Regulatory Commission (FERC) issues licenses for hydropower projects under the provisions of the Federal Power Act. In order to decommission (surrender) a hydropower facility that is under FERC jurisdiction, the licensee must file a request with FERC. An application to decommission a project will be granted when FERC is satisfied that safety and environmental concerns are addressed. Only then can the project be removed from federal jurisdiction.

Power company [PacifiCorp](#), the owner of the dams, sought to renew its license to continue operating them in 2006 but faced opposition because of their adverse environmental impacts, which included a 90 percent decrease in salmon from pre-dam numbers (RES 2023). To be allowed to continue to operate, the dams would need to be retrofitted to allow better fish



Source: [Klamath River Renewal Corporation](#)

passage, and water quality in the reservoirs would need to be improved. Considering the expenses and risks involved, PacifiCorp opted for a settlement agreement that included removing the four dams.

The total cost of the dams' removal and river restoration is estimated at \$450 million (with the majority of that being for dam removal). The State of California provided a \$250 million grant for the work and PacifiCorp provided \$200 million. The project is expected to result in 400 miles of river being available for salmon migration

and reproduction. The Klamath River Renewal Corporation, a nonprofit established to oversee the process, contracted Renewable Environmental Solutions to plan and implement restoration activities, which include preparing native plant seedlings and restoring key tributaries to recreate high-quality spawning habitat for salmon. The project illustrates how restoration finance can be used for the end-of-life of large infrastructure projects, and the restoration scale that can be achieved.

## Risks

**RES is exposed to regulatory, market, and technical risks.** The market for compensatory mitigation banks and projects is driven by state and federal laws and regulations. Because mitigation banks are long-term investments, changes in regulation could have significant impacts on the market, as seen in 2023, when the United States Supreme Court limited the protection of wetlands and, therefore, the market for wetland mitigation credits (McElfish 2023). In addition, changes to how the law defines “restorable land” or “wetland credits” may create stranded assets, should the criteria for eligible land become more stringent. RES also faces some market risks, because demand for compensatory mitigation also depends on economic factors. Finally, the company is exposed to technical risks associated with restoring complex systems such as large rivers. Furthermore, credits are performance-based—released over time, based on the achievement of ecological milestones—and lack of ecological performance may affect the company’s cash flows.

## Lessons learned and broader relevance

**Laws and regulations mandating environmental compensation for development projects can create large, vibrant markets for ecosystem restoration.** At the global level, biodiversity offset schemes are currently mobilizing between \$6 billion and \$9 billion each year (NatureFinance et al. 2023). Companies and public agencies do not want to take on the responsibility of managing a wetland or biodiversity restoration project, and are willing to pay a premium to secure wetland mitigation credits when they become available.

**The potential for replicating and scaling this system in emerging market and developing economies hinges on strong regulatory oversight to establish and maintain credibility.** In particular, it is critical that regulatory offsets be used solely in conjunction with the full mitigation hierarchy (for further details, see [IFC Performance Standard 6](#)), and do not become a justification for avoidable impacts on nature. The wetland and stream mitigation banking system in the United States is one of the most robust environmental offset programs globally because of effective regulatory oversight and a strong land tenure framework. The regulatory framework focuses on permanent protection and management of the ecosystem benefiting from restoration, as well as on like-for-like replacement within the same watershed. There is also a direct correlation between ecosystem improvements and the number of credits available, and the system is transparent: projects go through public review and each sale is expected to be reported on a publicly accessible website. The credibility and transparency of the environmental compensation market are key enabling factors for replication of the RES business model in other countries and regions.

**The adoption of the Kunming-Montreal Global Biodiversity Framework is driving project developers' interest in voluntary frameworks for biodiversity certificates.**

While such a system shares similarities with regulatory biodiversity offset programs, there are several key differences. Biodiversity certificates are not designed to be used as offsets to negative impacts. Rather, they are a way to quantify the positive impacts of philanthropic contributions to nature. The demand for these certificates remains unclear at this stage, as potential buyers are exploring the role of biodiversity certificates in their sustainability strategy. Until there is a clear driver for this demand, the potential to scale biodiversity certificates is not clear (Box E4).

**BOX E4**

**Biodiversity credits for the voluntary market**

The interest in biodiversity credits as an instrument for channeling funding into nature conservation and restoration projects has been reinvigorated due to the inclusion of biodiversity credits as part of Target 19 on resource mobilization in the Kunming-Montreal Global Biodiversity Framework. The size of the market, excluding offsets, is currently estimated at only \$8 million (Manuell 2023). However, several initiatives around the world are exploring the instrument's potential. "Beyond

Value Chain Biodiversity Credits" (also Certificates or Claims) is a new instrument that seeks to capture investments that are separate to—and go beyond—biodiversity offsetting or value chain investments to contribute to positive biodiversity gains (or uplifts) with the ultimate objective of achieving global biodiversity (and climate) goals (NatureFinance et al. 2023).

While the market for such biodiversity credits is nascent and yet to prove its value, it is being piloted in several countries. For example, Terrasos, a private company in Colombia, focuses on generating environmental offsets under mandatory environmental compensation markets. It has








recently created El Globo Cloud Forest Habitat Bank, a habitat bank that will generate biodiversity certificates for the voluntary market. Credits are not all released upfront. Instead, they can only be released and sold when the project meets specific ecological milestones verified by a third party. The credits are then registered on the [Biotrust Registry](#). Credits can be purchased individually for \$25 or bulk purchase can be negotiated directly with Terrasos. The sources and volume of demand for such credits are still uncertain, however, and there is no globally accepted standard or methodology to quantify outcomes linked to biodiversity credits.



**Credit:** Resource Environmental Solutions

## F

## Coastal restoration program at Iberostar

|                                                                                                                                                                                         |                                                                                                                                                         |                                                                                                                                                              |                                                                                                                                                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
|  <b>Theme</b><br><br>Coastal ecosystems—coral reefs, mangroves, and sand dunes                         |  <b>Geography</b><br><br>Dominican Republic, Jamaica, Mexico           |  <b>Sources of finance</b><br><br>Private finance (corporate)               |  <b>Instruments</b><br><br>• Company balance sheet investment |
|  <b>Investment drivers</b><br><br>Insetting for risk reduction; operational improvement/cost reduction |  <b>Investment size</b><br><br>Initially funded at the corporate level |  <b>Financial returns</b><br><br>Not applicable/below-market rate (resorts) |                                                                                                                                                  |

### Context

**The Caribbean region is heavily dependent on the goods and services provided by coastal ecosystems.** Coral reefs, mangroves, marshes, seagrasses, and sand dunes not only support biodiversity and sequester carbon, but also underpin the economies of 37 coastal and small island countries and territories (Patil et al. 2016). Tourism contributes to more than 15 percent of the Caribbean's GDP. Reef-associated tourism alone generates nearly \$8 billion annually from more than 11 million visitors (Escovar-Fadul et al. 2022).

#### **Coastal ecosystems are declining and so are the services they provide to hotel operators.**

For example, mangroves in the Caribbean have declined by 24 percent over the past 25 years (UNEP 2023), mostly due to deforestation. The living cover of the Caribbean's reef-building corals also has declined by 50 percent since systematic reef monitoring began in the late 1970s (Cramer et al. 2020). These trends create risks and additional costs for local hotel operations. The loss of charismatic reefs negatively impacts the value proposition of coastal resorts, since biodiverse reefs attract tourists. Reefs also help to replenish white sand on beaches and reduce the wave force reaching the shoreline. Estuaries created by mangroves and wetlands filter water from pollutants and stabilize the shorelines. Loss of reefs, mangroves, and sandy beaches and dunes reduces the ability of coastal ecosystems to shield properties from erosion, as well as storms and hurricanes. Substituting these ecosystem services with labor or gray infrastructure entails additional costs.

**Reversing the loss and degradation of reefs, mangroves, and other coastal ecosystems requires coordinated conservation efforts, innovation to scale restoration efforts, and, in the case of coral reefs, research and development** (Box F1). Coordination between



communities, multiple hotel operators, and the fishing and waste management sectors is needed to reduce pressure on coastal ecosystems. Coordination with the state and local government is also required, because they manage public beaches and grant permits to implement conservation or restoration projects. Local government also enforces no-build zones to prevent further coastal degradation. Adequate financing from various sources is needed to implement a holistic approach required to halt and reverse the decline of these ecosystems.

#### BOX F1

### The challenge of restoring coral reefs

Coral reefs in the Caribbean are succumbing to a combination of global pressures (such as rising sea temperatures and severe tropical cyclones, which are causing large-scale coral bleaching) and local pressures (such as land-based pollution runoff and disease). To halt and reverse the rapid loss of reefs in the Caribbean basin, which has

lost more than half of its living reef cover since the 1970s (Cramer et al. 2020), the first step is to reduce local pressures. This could be achieved by establishing marine protected areas, transitioning to sustainable fishing practices, improving solid waste management and wastewater treatment, and controlling invasive species. Another avenue is to actively restore depleted or damaged reefs by “outplanting”, or transporting corals from nurseries into the reef habitats. However, active restoration remains a challenge. It is expensive

and labor-intensive, requiring many divers and long hours. Importantly, the probability of success is limited due to climate change (which continues to devastate corals) and continued presence of other pressures, and the slow growth rates of corals. This limits the feasibility of restoring corals at scale (Blanco-Pimentel et al 2022). Identifying coral species that are resilient to climate change is an important focus of global R&D (Butler et al. 2023) and key to the success of restoration initiatives.

## Project description

Iberostar is a family-owned hotel chain with 24 hotels and resorts in the Caribbean and Central America region. In 2020, the company committed to protect and restore the ecological health of the ocean that its business depends on. In 2022, Iberostar published its coastal restoration strategy, “Wave of Change” (Iberostar 2022), in which the company pledges to restore coastal ecosystems, ban single-use plastics, set climate targets, and shift to 100 percent responsible seafood consumption at its hotels by 2025.

Restoration underpins Iberostar’s goal of carbon neutrality by 2030. The hotel chain plans to decarbonize its operations and supply chain (reducing 85 percent of its emissions). Of the remaining emissions, 75 percent will be offset through high-quality carbon offset such as those generated by Iberostar’s ecosystem restoration projects (Iberostar 2022). In 2019, 75 percent of Iberostar’s Scope 1 and 2 emissions totaled 172,500 metric tons. Under its carbon neutrality goal, Iberostar has committed to placing 22,000 hectares of mangroves or other coastal ecosystems in protected areas or under other effective area-based

conservation measures by 2030. Conserving and restoring these ecosystems is expected to sequester 500,000 tCO<sub>2</sub>e per year (Iberostar 2022).

Iberostar exemplifies a private-sector-driven coastal restoration model. Half of Iberostar's properties are on coastlines facing the Caribbean basin. These properties cumulatively boast 10.2 kilometers of beachfront, 80 percent of which have reefs within five kilometers of land (Blanco-Pimentel et al. 2022). Under its Wave of Change strategy, Iberostar is enabling the restoration of reef ecosystems, seagrasses, mangroves, wetlands, and sand dunes across 12 resorts in the Dominican Republic, Mexico, and Jamaica (Iberostar 2022). To achieve this, it has invested in:

- **Creating six coral nurseries to produce coral micro-fragments, which are being used to restore reefs at five resorts** in the Dominican Republic, Mexico, and Jamaica through coral micro-fragmentation and outplanting. In Jamaica, restoration is being implemented in an area co-managed with the other local stakeholders. These investments are also helping to increase fish biomass, which is important not only for biodiversity but also for local food security. To strengthen the conservation and restoration outcomes of its coral restoration program, Iberostar is also helping restore biodiversity on reefs of adjacent hotels.
- **Planting more than 19,000 mangrove plants at Iberostar's Bavaro resort in the Dominican Republic.** Iberostar is looking to restore more than 1,000 hectares of mangroves in the Dominican Republic as part of its carbon neutrality goal.
- **Establishing four sand-dune-plant nurseries growing more than 11,000 plants in Mexico, which will be used to restore sand dunes in front of Iberostar resorts.** Dune restoration is already being implemented in Cozumel, Paraíso, Playa del Carmen, and Cancun. The goal is to plant 25,000 plants, notably shrubs. Iberostar is also developing agreements with other nurseries and hotels to restore a wider area of sand dunes.

Iberostar has assembled internal multidisciplinary teams that include scientists, operation coordinators, and restoration technicians to support its restoration program and inform its scientific research on corals. These teams collaborate with academia to identify the most temperature-tolerant coral species in Iberostar's nurseries and the best planting protocols to ensure colonization. Iberostar has an agreement with Old Dominion University to acquire a portable lab system to conduct heat stress experiments across multiple countries (Blanco-Pimentel et al. 2022). The restoration work is also supported by local NGOs, communities, and volunteers.

## Financial solution

**Iberostar finances its Wave of Change strategy and associated activities through its corporate sustainability budget.** The group aims to demonstrate the benefits of environmental restoration so that, in future, the costs of restoration may be incorporated in each resort's budget and reported in each individual hotel's profit-and-loss statement.

**Restoration adds value to Iberostar by protecting and enhancing its value proposition, reducing physical risks and associated costs, and by supporting employee retention.**

Specific benefits include:

- **Risk and cost reduction.** The attractiveness of the company's resorts is highly dependent on the quality of the beaches and coastal areas near the hotels. Coral reefs and mangroves ensure that beaches retain their sand and avoid the costs related to beach nourishment and other coastal protection measures. Healthy oceans also deposit less algae and seaweed (notably sargassum blooms), saving the company on beach-cleaning costs.
- **An improved guest experience.** The sustainable tourism business model is attractive for the growing nature-based tourism segment. Iberostar also offers environmental education to tourists.
- **Employee retention.** Many employees care deeply about the health of the coastal environment. In addition, many staff members come from local communities that directly depend on the ocean for their livelihoods and health. Coastal restoration projects allow Iberostar to maintain a high level of engagement with staff and a license to operate with local communities.

**Iberostar also benefits from in-kind support through partnerships with academia and development agencies** (see also Figure 16 on page 28). For example, in 2022 Iberostar signed an agreement with the tourism and the environment secretaries of Quintana Roo, The Nature Conservancy, and the German Agency for International Cooperation (GIZ) to disseminate lessons learned and seek joint action opportunities from its coastal dune restoration initiatives (Iberostar 2022).

## Risks

**The main risks of Iberostar's coastal restoration program stem from the technical complexity of restoring such ecosystems and the limited control over external pressures such as the actions of other hotels operating in the vicinity.** Restoration activities may be unsuccessful because of external factors such as climate change or

the reluctance of neighboring operators to embrace more sustainable practices such as managing pollution or conserving shared natural assets. There is also the chance that restoration will generate lower-than-expected reductions in risk and costs. This could limit the uptake of the program across other resorts within the group, limiting the scale and impact of restoration activities. Reef restoration is also a proof-of-concept initiative with no guarantee of success considering the climate vulnerability of corals.

## Lessons learned and broader relevance

**Iberostar shows that the tourism sector can play a pivotal role in scaling up coastal restoration and making contributions that extend beyond financing.** The sector's economic stability could make it a stable source of funding that is independent of grant cycles and external funding. Iberostar's approach also demonstrates that hotel operators, whose businesses are linked to the health of local ecosystems and who have a long-term presence in seascapes with established logistical networks and community connections, can directly participate in the science and activity of restoration and conservation as part of their business case.

**Restoring coastal ecosystems also represents revenue opportunities in the form of blue carbon.** Mangroves, seagrass beds, and coastal wetlands are established categories of wetlands inventory for reporting to the United Nations Framework Convention on Climate Change and are eligible for blue carbon credit schemes. Blue carbon investments are among the most effective climate solutions available: restoring one hectare of mangrove forest has, on average, a mitigation output more than five times higher than that of a similar area of restored terrestrial forest. Seagrass restoration compares to terrestrial restoration at a factor of 3:1, and seagrass conservation at a factor of almost 2:1. For saltmarsh restoration and conservation, the ratio is almost 2:1 (World Bank 2023a). Sale of blue carbon credits from restoration initiatives could help resorts generate additional cash flows and monetize some of their restoration initiatives, in addition to using these nature-based solutions for voluntary insetting and risk reduction.

**Despite the initiative of some private sector hotel operators such as Iberostar, public funding and policy are still critical.** The outcomes of a restoration program will be limited if other operators and other economic sectors continue exerting pressure on the ecosystem. By nature, R&D related to restoration (for example of coral reefs) is a public good and requires public funding and support. Changing the trajectory of declining coastal ecosystems such as coral reefs, which are in danger of reaching a tipping point, requires concerted effort across the public and private sectors to address the drivers of their loss and to significantly scale models such as Iberostar.

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# Blueprints for Private Investment in Ecosystem Restoration



**Lessons from Case Studies**



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